STEEL
The Metalworking Weekly

DECEMBER 5, 1955
Vol. 137 No. 23

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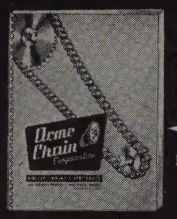

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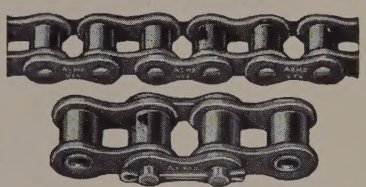

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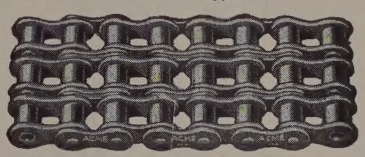

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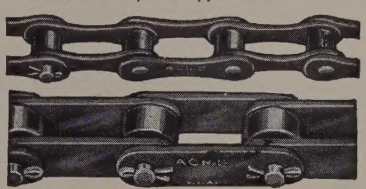

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For use in slower speed power transmission and material handling conveyors.

CABLE CHAINS
Acme Cable Chains are furnished in a variety of pitches, widths and strength.

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Acme Sprockets are available in a wide range of sizes, in all types.

PHONE JEfferson 2-9458.

Acme Chain Corporation
HOLYOKE MASSACHUSETTS

making a
MARKED IMPROVEMENT
in PAINT CAN MARKING

The problem of paper labels on cans becoming dirty and torn (and presenting a poor sales appearance on the retailer's shelf) plagued a typical paint manufacturer, until he began using the Markem Method. Now he's imprinting variable data (color, batch number, etc.) on 1500 lithographed cans per hour with a Markem 70AF machine. Changing imprint simply means sliding new type into the master-plate (instead of ordering 2000 new labels). Whether it's a container, product, part or tag you're marking—for decoration, designation or identification—ask Markem. Thousands have, for the past 40 years. Write Markem Machine Co., Keene 30, New Hampshire.

MARKEM ...TO MAKE YOUR MARK

behind the scenes

Building Bonanza

Construction prospects for 1956, according to the story on page 81, are mouth watering for everybody who has any stake at all in this business. This year construction is at a $42 billion rate; next year, the experts say, $44 billion will be paid out for homes, buildings, highways and the many construction projects already planned The figures make your head swim if you really try to grasp them. How much is a billion dollars, anyway? In French and American numeration, it is a mere thousand million; in German and English numeration, it is a million million. *Pravda* hasn't taken a stand one way or the other, so we may never know what a billion rubles amounts to.

The figures in STEEL's construction article will increase your respect for this front-running industry. Construction has been an industrial pace setter every year since the war, and statistics suggest that 1956 will be no exception.

We keep coming back to that $44 billion figure like a child to an open flame; figures are so crazy if you really dig them. For instance, it is said that the quantity of pi was definitely computed in the 16th century by a Hollander, name of Ludolph von Keuler. Sounds like a Japanese spy named Rudolph, doesn't it? Well, Ludolph worked at pi all his life, and finally came up with 3.141,592,653,589,793,-238,462,643,383,279,502,884+. He was so excited he requested that this great discovery be engraved on his tomb, and we were so excited after counting up all those ciphers we added an epitaph:

Ludolph von Keuler
Would never say die:
He wanted to know
The meaning of pi;
So he figured and sweat
And mumbled, 'tis said,
Of ciphers and digits
That danced in his head
Till his shaky old hand
Could scarce hold the quill,
And Ludolph, himself,
Was over the hill.
"A vill-o'-de-visp,"
Said neighbor von Schimmel;
"Von Keuler iss punchy—
Und dot pi! Gott in himmel
But shortly before
Our genius expir
He called for a quill
And, fully inspire
He scratched out a set
Of ciphers aw
Purporting to be
Elusive old
"Now, when I am dead,"
Von Keuler he groan
"I want all them figures
Graved into the sto
That covers my tomb,
So folks passing
May know these remains
Are the Pappy of p

Promote Editors

Two of our associate editors ha been sent forth to toil in the met working news pastures of New Yo and Washington. James P. Morr sey, who used to edit the Busine Trend section in STEEL, has been a pointed head of STEEL's Washingt bureau. A Purdue University grad ate, Jim joined STEEL as assista editor in 1954. He was promoted associate editor in 1955. Previous as both a serviceman and civilian, was an electronics technician in t Air Force. In his new capacity, will write Windows of Washingt and handle general news assignmen

As soon as Associate Edi Stanley Stewart sells his house a recovers his spare suit from t cleaners, he will move to N York to join Ben Price and L. Browne in STEEL's eastern offi "New York doesn't scare me a bi said Stanley, eying a map of t metropolis, "because I'll probably l in Connecticut, or Pennsylvania, some other place within easy co muting distance."

Before joining STEEL in 19 Stewart devoted several years ing newspaper, advertising a technical writing. He is a gradu of Western Reserve University, a had two years of engineering at St ford University.

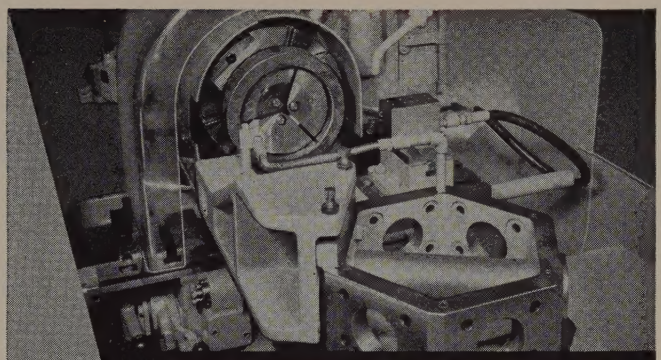
Shrdlu

(Metalworking Outlook—Page 75)

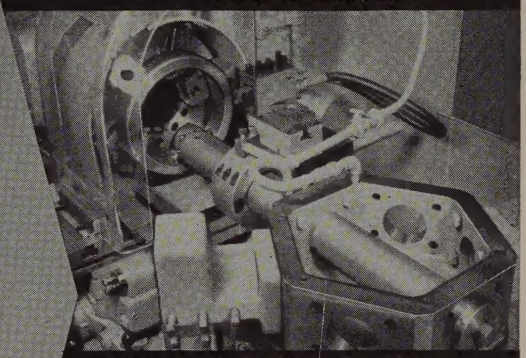
and capable of doing jobs like this...

Machine tools do not pay dividends unless they are cutting metal. Engineering the tooling around the parts to be produced reduces the setup time to a minimum, and in many cases doubles the production per labor hour.

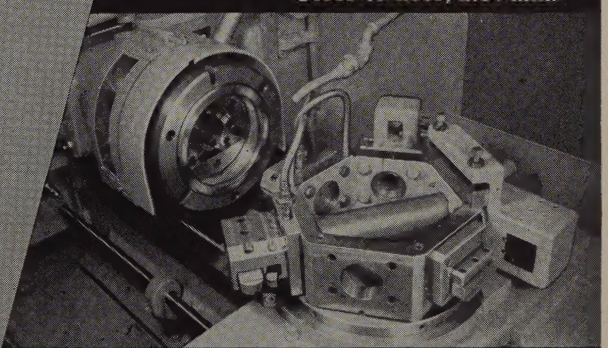
In this case high production methods of tooling for automatic lathes were simplified and applied to three 7B J&L Universal Saddle Type Turret Lathes. Inner and Outer Ball Bearing Races and Roller Bearing Races are produced on the same machines. Setup time from one lot to the next does not exceed fifteen to twenty minutes per machine.



First Operation: One tool mounted on the Hex Turret turns the O.D. while a tool mounted on the rear of the cross slide faces one end. At the end of the facing cut, the radius on the O.D. is formed. Floor-to-floor, 1.94 min.



Second Operation: Location is taken from the two previous finished surfaces. Boring and I.D. chamfering are performed by using tools mounted on the Hex Turret while facing and forming of the O.D. are finished by tools mounted on the rear of the cross slide. Floor-to-floor, 2.57 min.



Third Operation: Special wrap-around jaws mounted on a power operated three-jaw scroll chuck are used for holding the finish turned ring when grooving. The groove is formed by a radius tool held in a bar mounted on the Hex Turret (this applies to internal or external straight or taper races). I.D. is also chamfered in this operation. Floor-to-floor, 1.67 min.

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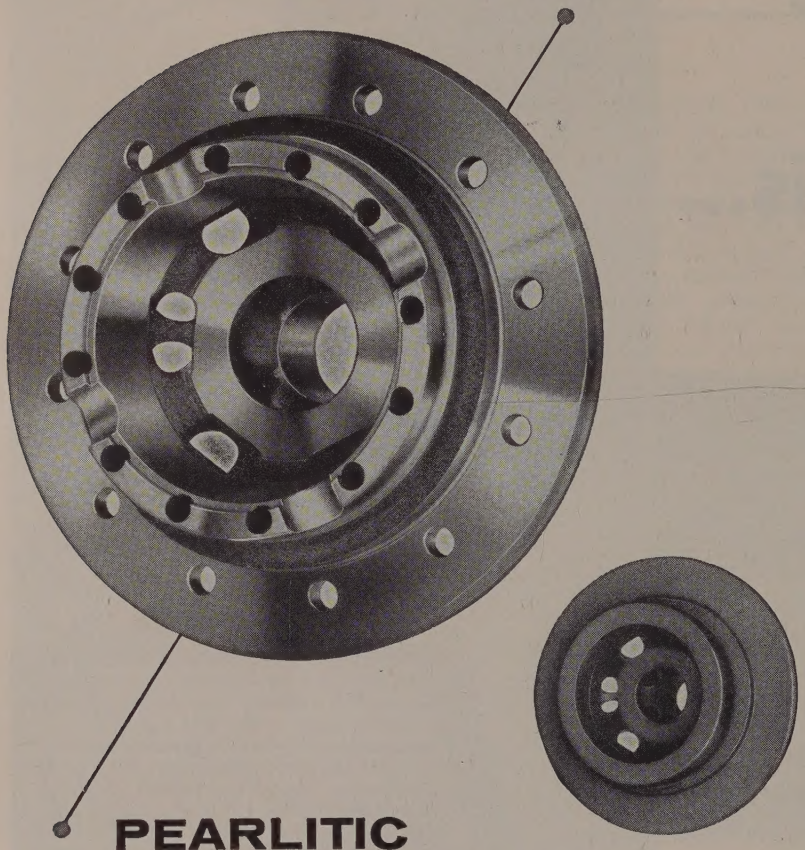
517 Clinton St., Dept. 710, Springfield, Vt., U. S. A.
Please send me the J & L Machine Tool Replacement Information Kit.
*Name*_____
*Title*_____

MACHINABILITY INDEX 80-90*



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*B1112 STEEL = 100

Low machinability index of 80-90 (B1112 steel = 100) is probably reason enough to warrant serious consideration for your product.

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LETTERS TO THE EDITORS

Fuel Industry Analyzed

You have done a workmanlike job of analyzing the current primary fuels industry in your story, "Primary Fuels Get Set" (Nov. 14, page 73).

G. Don Sullivan
Administrative Assistant
National Coal Association
Washington

Groundwork Is Important

Please forward three copies of the tenth article in the 1955 Program for Management, "Keep Your Product Growing" (Nov. 14, page 101). I believe the article will be of value in keeping our organization alert and our product growing.

Jack Clayton
Vice President-Mfg.
Otto Bernz Co. Inc.
Rochester, N. Y.

Your article is excellent! I would appreciate six copies so that our key men will have a chance to study it in detail.

Please keep that type of excellent article appearing in your magazine. They are certainly worth-while.

E. J. Abendschein
Chisholm-Ryder Co. of Pennsylvania
Hanover, Pa.

Please send three copies of this story. It is another one of the series that we find extremely interesting. The entire series has been constructive, and your editors are to be congratulated on the publication of such timely articles. If you plan publication of this series in one volume, we would be pleased to order several.

E. H. Rhodes
Executive Vice President
M. H. Rhodes Inc.
Hartford, Conn.

• *At this time we do not plan to publish it in one volume.*

Information on Wildcats

I am interested in your story, "How To Tame Wildcats" (Oct. 3, page 37). It contained a lot of useful information and was well written. Please send two copies.

William J. Kern
Sayre Apts.
Bethlehem, Pa.

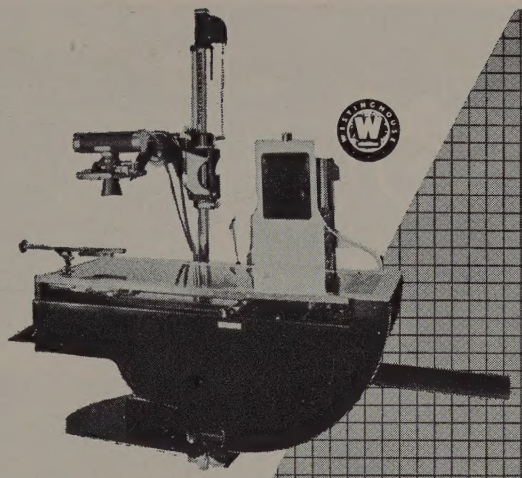
Firm Reviews Auto Cost

The article, "Are You Paying Too Much for Auto Expense?" (Oct. 11, 1954, page 67), has been referred to this department, and reviewed with some interest. We note that a second story

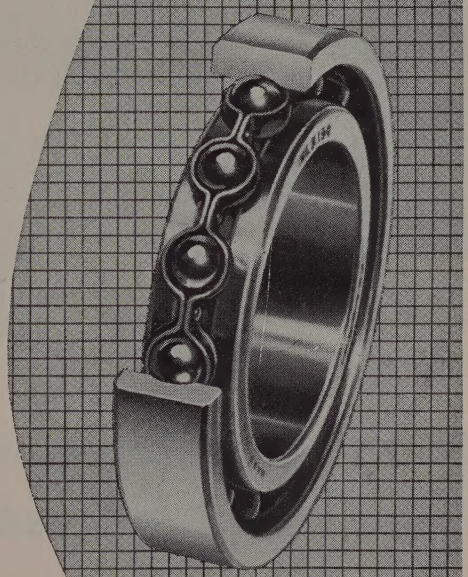
(Please turn to page 12)

to save a life

X-ray tables require a precision all their own, for smooth, easy positioning. And, if you were to X-ray this Westinghouse Duoflex motor-driven table, you would see Federal Ball Bearings quietly at work here, too.



so much of industry *turns* on FEDERAL ball bearings



X-rays or escalators—hum of motors or heft of hoists—in the clinic or machine shop—Federal Ball Bearings do their quiet, anti-friction job. In your office, plant or home, you'll probably find some of the hundreds of types and 12,000 sizes produced by this 50-year-old manufacturer of ball bearings exclusively.

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175 pages, chock full of data about ball bearings are yours for the asking in FEDERAL's new catalog. Just drop us a line for your copy.

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or lift a safe

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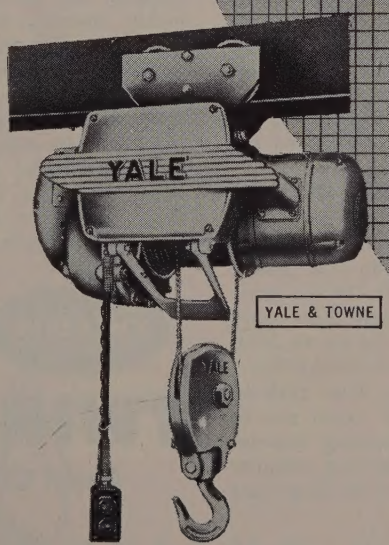

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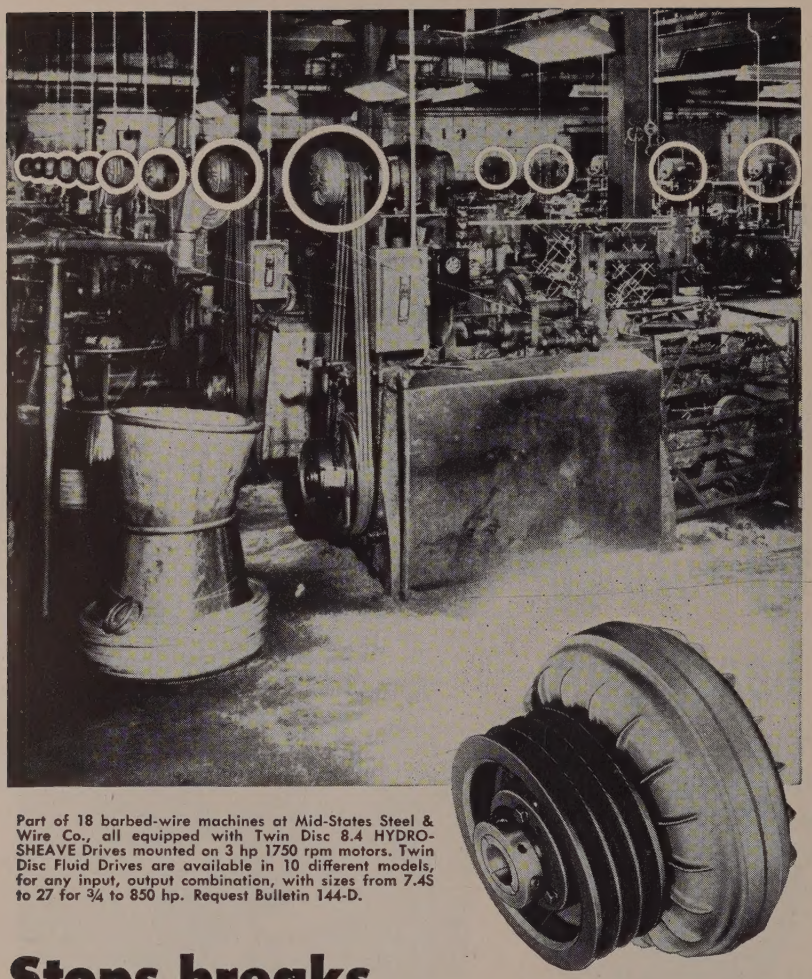

Part of 18 barbed-wire machines at Mid-States Steel & Wire Co., all equipped with Twin Disc 8.4 HYDRO-SHEAVE Drives mounted on 3 hp 1750 rpm motors. Twin Disc Fluid Drives are available in 10 different models, for any input, output combination, with sizes from 7.45 to 27 for ¾ to 850 hp. Request Bulletin 144-D.

Stops breaks and spares the horses

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LETTERS

(Concluded from page 10)

"Are You Getting the Most Out o Your Fleet Operation?" (Oct. 18, pag 60) was to be printed.

We fully appreciate the time that ha elapsed, but the subject has recentl become of interest in our company. I available, we would like reprints.

M. C. Singley Jr
Audito
Harrington & Richardson Inc
Worcester, Mass

Selector Aids Engineers

I would appreciate ten copies of th Metal Selector (insert in the Oct. 1 issue). They would be of invaluable as sistance to the drafting section of ou engineering department.

Harry Schut
Engineering Dept
Wheel & Brake Plan
Tire & Equipment Divisio
B. F. Goodrich Co
Troy, O

We feel this is a worth-while piec of information. We would like copies fo each of our ten salesmen.

H. L. Eck
District Service Manage
Kaiser Aluminum & Chemical Sales Inc
Milwaukee 3, Wis

Ceramic Cutting Tool?

We have read with interest the Ma chine Topics column of Oct. 31 (pag 74). Do you have any more informatio on ceramic cutting tools?

Ernest J. Svenso
Presider
John S. Barnes Corp
Rockford, Il

• *The column summarized most of th information we have. For further data contact Carboloy Dept., General Elec tric Co., P. O. Box 237, Roosevelt Par Annex, Detroit 32, Mich. or Norton Co 50 New Bond St., Worcester 6, Mass.*

Powdered Lubricant

In the Technical Outlook column of recent edition of STEEL (July 11, pag 87), I read of a powdered lubricant de veloped by Glyco Products Inc. Wher may I get additional information abou this product?

K. G. Willoughby Jr
Chief Chemis
Morse Chain Co
Ithaca, N. Y

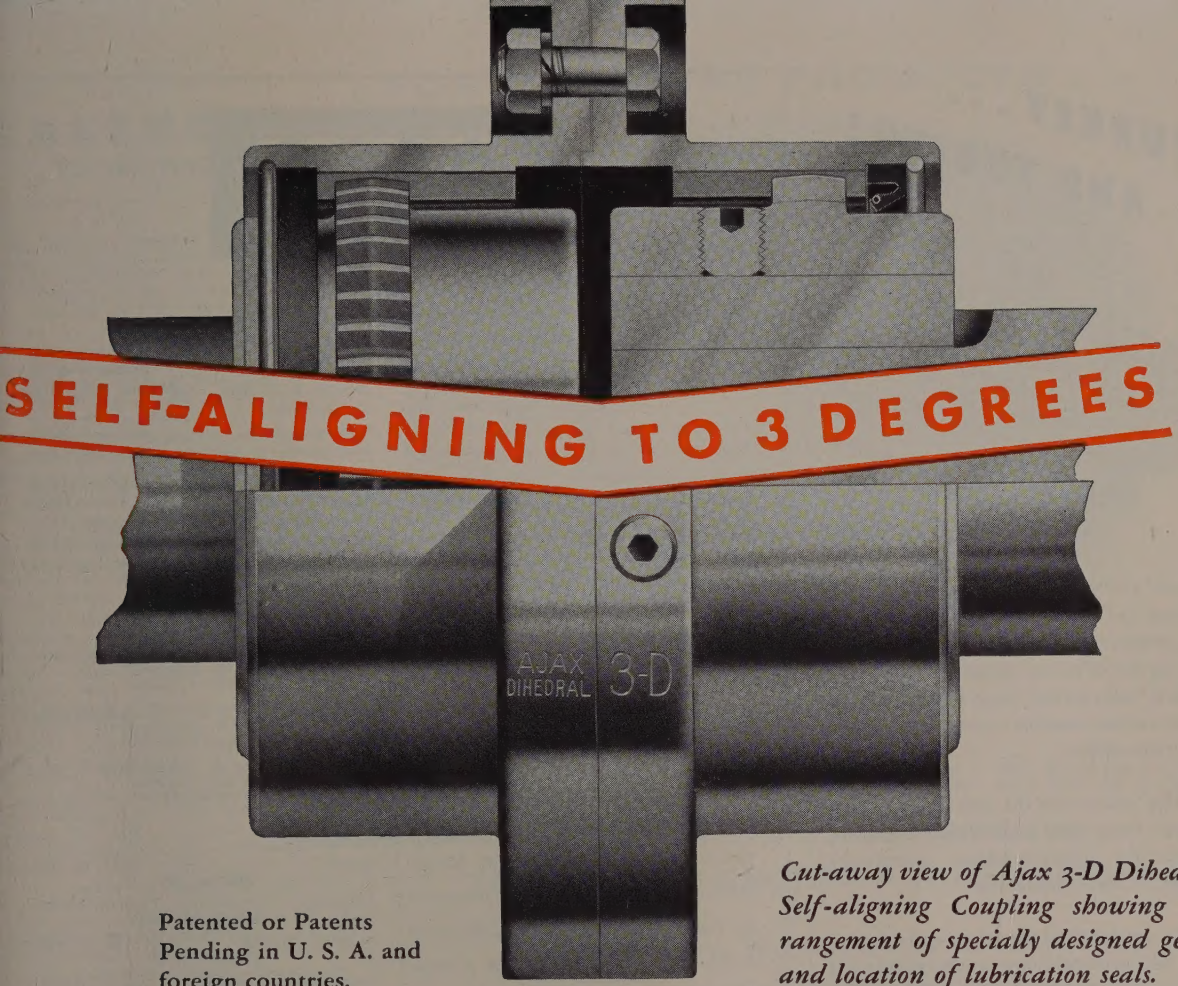
• *Write the company at: Empire Stat Bldg., New York 1, N. Y.*

Story Assists Executives

May I have a copy of the metalwork ing map illustrated in the article, "Mar ket Facts: Where You Find Them an How To Use Them" (Oct. 24, page 91)

The article is an interesting one an would be of great assistance to anyon in a management position.

H. F. Kroh
District Sales Offic
Bethlehem Steel Co
Chicag



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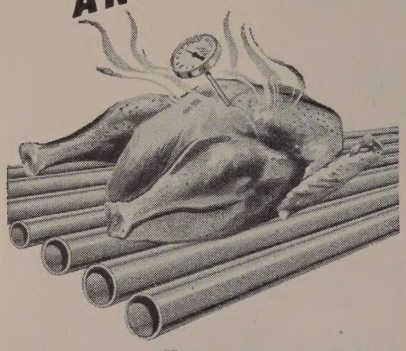

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CALENDAR
OF MEETINGS

c. 5-9, **National Exposition of Chemical Industries:** Commercial Museum and Convention Hall, Philadelphia. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y. Manager: E. K. Stevens.

c. 7-9, **American Institute of Mining & Metallurgical Engineers:** Electric furnace steel conference, William Penn hotel, Pittsburgh. Institute's address: 29 W. 39th St., New York, N. Y. Secretary: E. H. Robie.

c. 7-9, **National Association of Manufacturers:** Annual meeting and exhibit, Waldorf Astoria, New York. Association's address: E. 48th St., New York, N. Y. Secretary: Noel Sargent.

c. 12-13, **Material Handling Institute Inc.:** Annual meeting, Hotel Statler, New York. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

c. 12-16, **Atomic Exposition and Nuclear Engineering & Science Congress:** Public Auditorium, Cleveland. Information: International Atomic Exposition, 931 Book Bldg., Detroit 26, Mich.

c. 13-15, **Industrial Truck Association:** Winter meeting, Hotel Statler, New York. Association's address: Washington Loan & Trust Bldg., Washington 4, D. C. Managing director: William Van C. Brandt.

. 3-6, **Institute of Scrap Iron & Steel Inc.:** Annual meeting and exhibit, Sherman hotel, Chicago. Institute's address: 1729 H St. N. W., Washington 6, D. C. Executive vice president: E. C. Barringer.

. 9-13, **Society of Automotive Engineers Inc.:** Annual meeting, Sheraton-Cadillac hotel and Hotel Statler, Detroit. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

. 11-13, **Aluminum Extruders Council:** Annual meeting, Saxony hotel, Miami Beach, Fla. Council's address: 209 Washington St., Boston, Mass. Executive secretary: Phillip Semelman.

. 11-14, **American Road Builders' Association:** Annual convention and exhibit, Municipal Auditorium, Miami Beach, Fla. Association's address: World Center Bldg., Washington 6, D. C. Executive vice president and secretary: Eugene Reybold.

. 18-19, **Caster & Floor Truck Manufacturers Association:** Annual meeting, New Weston hotel, New York. Association's address: 27 E. Monroe St., Chicago 3, Ill. Secretary: Harry P. Dolan.

. 18-19, **Steel Shipping Containers Institute Inc.:** Winter meeting, Hampshire House, New York. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

. 19-20, **Steel Plate Fabricators Association:** Annual meeting, Palmer House, Chicago. Association's address: 79 W. Monroe St., Chicago 3, Ill. Secretary: J. Dwight Evans.

. 20, **Malleable Founders' Society:** Semi-annual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 15, O. Secretary: Lowell D. Ryan.

. 23-24, **Industrial Heating Equipment Association:** Annual meeting, LaSalle hotel, Chicago. Association's address: Associations Bldg., Washington 6, D. C. Executive vice president: Carl L. Ipsen.

. 23-25, **Truck-Trailer Manufacturers Association Inc.:** Annual meeting, Edgewater Gulf hotel, Edgewater Park, Miss. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

. 23-26, **Plant Maintenance & Engineering Show:** Convention Hall, Philadelphia. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

. 24, **Cutting Tool Manufacturers Association:** Annual meeting, Detroit Yacht Club, Detroit. Association's address: 416 Penobscot Bldg., Detroit 26, Mich. Executive secretary: Martin J. Ewald.

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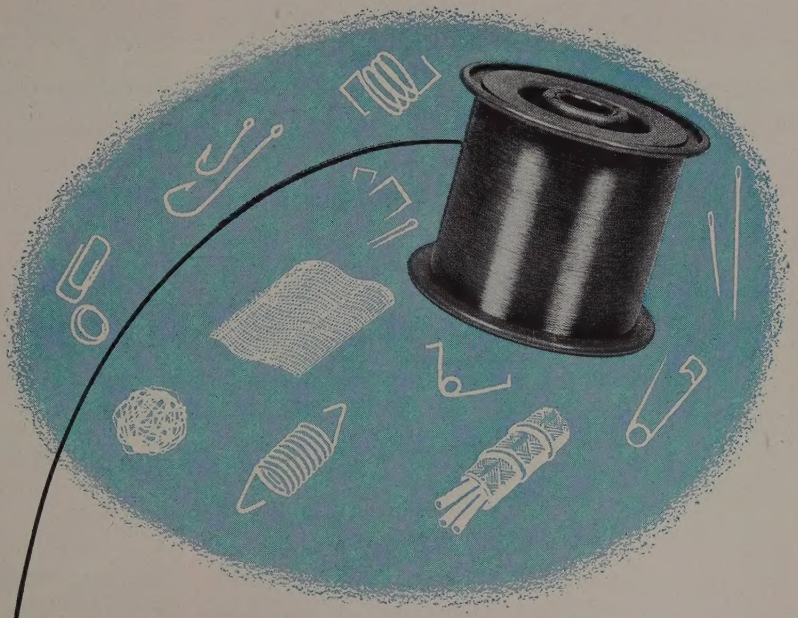

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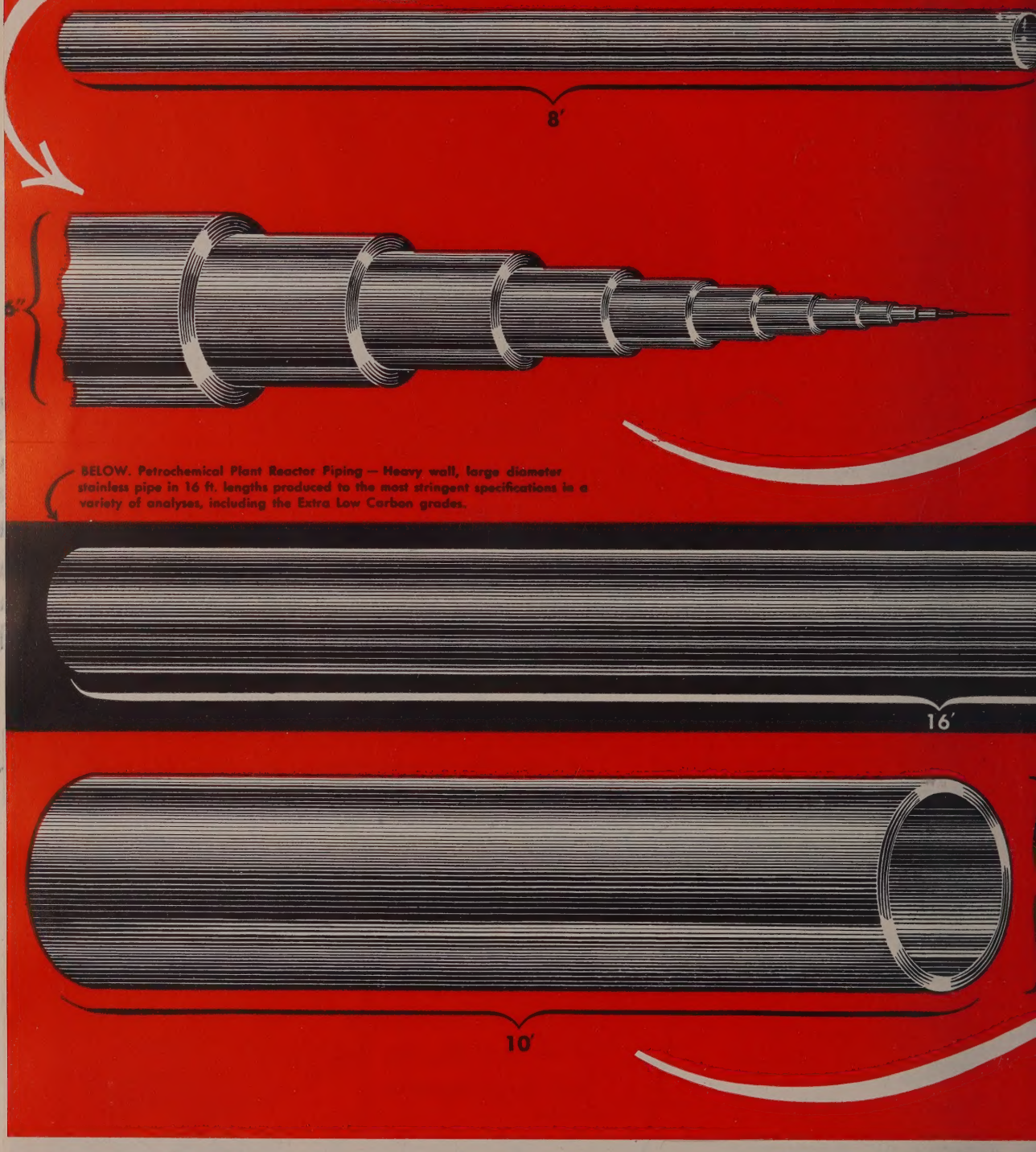

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THE DIFFERENCE... *Carpenter* stainless uniformity

These hinge pivot pins for automatic dishwashers were being turned out by "doing things the hard way." Tools had to be reground every eight hours. The ordinary Type 303 steel used wasn't uniform, refused to hold size, and didn't provide the required finish.

This job could easily have been chalked up as a "necessary headache," but someone wasn't satisfied . . . was willing to explore the possibilities for improvement. As a result, Carpenter Stainless No. 8 (Type 303) has brought these worthwhile changes: Tool regrinding is required only every 18 to 24 hours . . . final grinding of the part is eliminated because size tolerances were held so accurately . . . bar after bar machines the same . . . and each part now costs 50% less.

Build your own improvement program with the cooperation of Carpenter . . . originator of the first Free-Machining Stainless. The steel can be in your plant almost immediately if you call your nearest Carpenter Mill-Branch Warehouse, Office or Distributor now. *The Carpenter Steel Co., 139 W. Bern St., Reading, Pa.*

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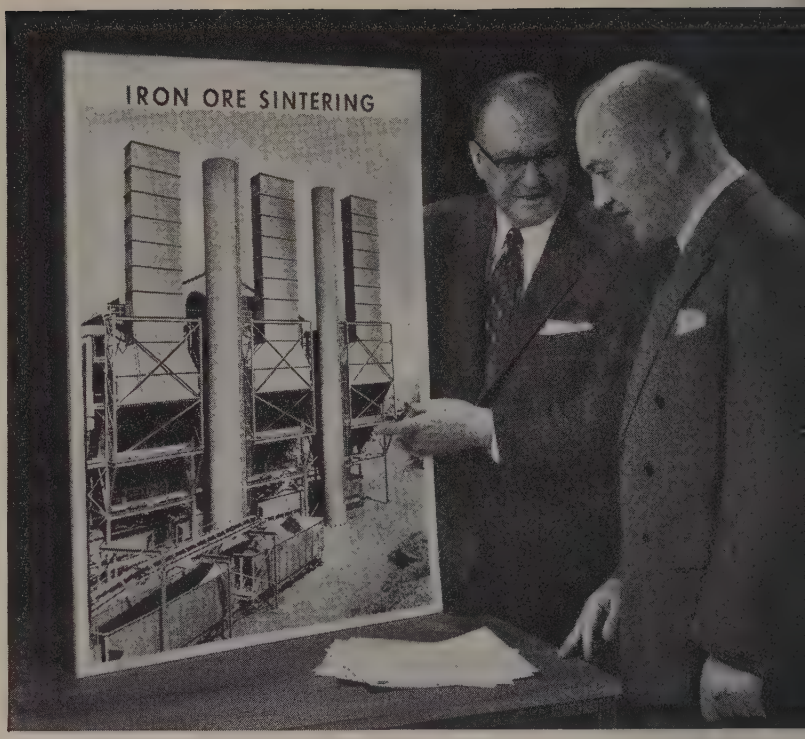
(Advertisement)

How the Steel Industry Is Fighting Air Pollution



When the public hears about dust and fume control it is often in terms of what has *not* been done. It is important that they should also know what *has* been done, because the record of the steel industry is one of the most progressive.

The purpose of this discussion is to give the executives the facts to prove this point.

Q. *First of all, how can you measure the progress of dust and fume control in the iron and steel industry?*

A. As you know, there are many ways to combat air pollution. Equipment and methods vary in effectiveness, but the industry agrees that electrical precipitators have the highest collection efficiencies. By keeping track of the demand for this high efficiency equipment over the years, we can get a good indication of the importance the industry places on dust and fume control and the progress they are making.

Q. *Do these figures show an increasing interest in this high efficiency equipment?*

A. Suppose we let the figures speak for themselves. Since 1945 precipitator capacity in the steel industry had a greater increase than in any previous ten year period. Precipitators handling about 6½ million cfm were installed during this period.

Q. *But can't you attribute this growth to the increase in steel-making capacity?*

A. Some of this growth is due to expanded production facilities, but that's just a part of it. For instance, iron and steel production has increased about 30% since 1945 — but precipitator capacity has increased about 130% during this same period.

Q. *In the old days, I guess precipitators were used primarily in blast furnaces, weren't they?*

A. That's right. The first one went into operation in 1930. Since then, 169 Research Cottrells have been ordered by the industry.

Q. *What about new applications?*

A. We have a number of new uses that have proven themselves on the job. Open hearths, for instance. In one installation, our precipitators reduced stack discharge to a little over 2 pounds per hour. That's quite a reduction when you consider that the discharge without a precipitator ranged from 75 to 245 pounds per hour.

Q. *I understand your Cottrells are used on some sintering machines now. Is this true?*

A. Yes, we have three in operation and more under construction.

Q. *How about scarfing machines?*

A. This is a recent application whi has worked out very satisfactorily. Tw precipitators are now in operation this application.

Q. *Has anything been done on su problems as iron cupolas, electric f naces, and ferromanganese blast f naces?*

A. Yes. Installations have been ma on all these problems.

Q. *How do you go about develop these new applications?*

A. We work very closely with customers on these new projects. C laboratory is a big help, and our years of pilot plant experience plus o 2,000 precipitators give us the kind experience that leads to the success engineering of projects like these.

If you would like to have more inform tion about these applications, or if y want to investigate the possibility using precipitators on other equipme our nearest representative will be gl to call on you.

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RC

STEEL

Metalworking Outlook

December 5, 1955

Auto Soft Spots?

It's too early to draw conclusions, but auto sales in the first ten days of November were the lowest for the first third of any month this year. Loose credit, which helped move so many 1955 models, may not aid so much for 1956 cars. Government actions have boosted rates and made money harder to borrow. And lenders don't want to lengthen the repayment period beyond the average 30 months that's current now. The situation is not serious, but you'll want to keep an eye on it.

GM in the Headlines

The General Motors Corp. investigation by the Senate's O'Mahoney committee is drawing a lot of headlines, but it's unlikely that any action will stem from it. Even a former Justice department attorney, Holmes Baldridge, who handled two prosecutions against GM and GMAC, admits that the department was unable to find enough evidence of GMAC "coercion" of GM dealers to justify action as recently as 1952. Then a civil suit rising out of a GM conviction in a criminal action was ended by consent decree.

Bearings: Holding Up Freight Cars

As if the steel shortage weren't enough, freight car output is also being held down because bearings are hard to get. If those scarcities could be licked, carbuilding could double and still not fully meet demand. At the end of October, freight car order backlogs hit 61,954, compared with 12,853 a year earlier.

Shortage in Forging Steel

Gearmakers, drop forgers and many other metalworking firms are being plagued by inability to get carbon and nickel alloy forging steels. Other alloy forging grades are in a little better shape. Says Mondie Forge Co. Inc., Cleveland, about forging steel: "The first quarter looks tough; on the basis of mill allotments, we can work only three days a week."

More Republic Expansion?

Before Republic Steel Corp.'s current $130-million expansion program is finished by 1957, look for the company to announce still another one. The next move probably will be to build a completely new sheet and tin plate plant somewhere in the Great Lakes area. If Republic builds one about the size of the Fairless works, the cost would be around $500 million.

Labor's Unity Day

This is union merger week. The AFL and CIO become one. At a New York meeting that begins today (Dec. 5) the formal step will be taken,

uniting 10.2 million members of AFL and 5.2 million adherents of CIO. Still independent will be 57 other unions national in scope, claiming membership of 1.8 to 2 million. Question: Will the pressure increase on them to join the AFL-CIO orbit? Another 2000 to 2500 local unaffiliated unions also exist. They have an estimated membership of about 5 million.

Northwest's Industrial Magnet

Pacific Northwest power resources are attracting new industry. Some 50 projects, either new or expansions of present facilities, are under consideration. Helping the trend is the federal policy of encouraging private power development where possible. Some seven out of ten voters in Stevens county, Washington, approved sale of county utility facilities to the private Washington Water Power Co. The result indicates public approval of the federal power policy.

More Pentagon Planning

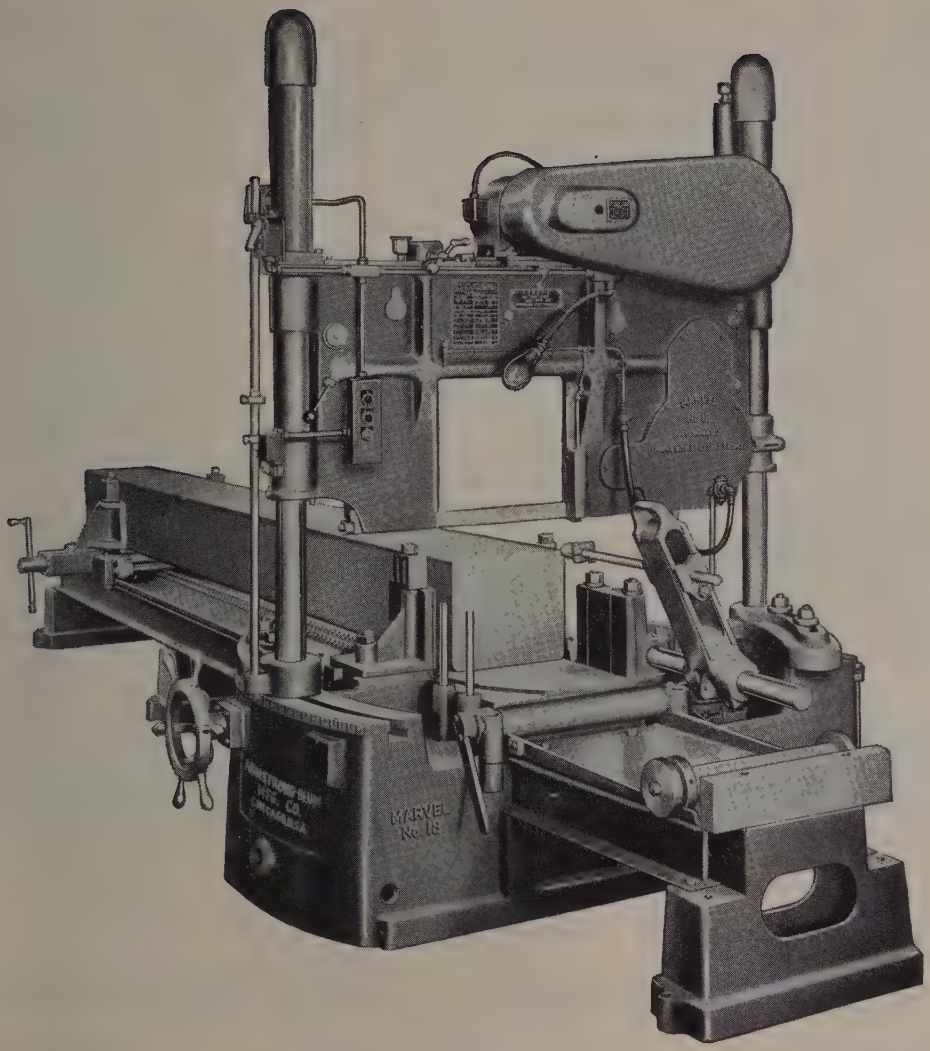
The Defense department is considering the compilation of a classified preferential planning list of the most critical items that would require advance facilities allocation and preparation of production schedules in times of emergency. Components would be included in such a list to make sure that adequate planning is done with subcontractors. The purpose of a preferential planning list is to assure planning for the more critical items and to prevent wasting of time by planning officers on items that can be produced easily and bought off the shelf.

Recruiting Starts Early

If you're waiting until spring to begin college graduate recruiting, you'll probably find slim pickings. Courting next June's grads is already in full swing. One University of Michigan Business Administration major gives his record to date: 100 on-campus interviews, eight expense-paid trips for company interviews.

Straws in the Wind

Kaiser Aluminum & Chemical Corp. will buy four extrusion presses from Birdsboro Steel Foundry & Machine Co. for its light press expansion at Halethorpe, Md.; the first unit will be in operation by the second quarter . . . Japan is negotiating with Kaiser Steel Corp. to purchase 100,000 tons of pig iron . . . Algoma Steel Corp. next spring will begin development of an iron ore deposit in the Calabogie, Ont., area . . . Only 1 home in 22 is equipped with mechanical air conditioning, according to a Du Pont study . . . New National Labor Relations Board Chairman Boyd Leedom and Stephen S. Bean, a new member, are middle-of-the-roaders who will be giving NLRB a strong shove in that direction.



No Job too big or too tough . . .

for MARVEL "*Giant*" Hack Saws

These giant MARVEL Hydraulic Hack Saws (No. 18, Capacity 18" x 18"; and No. 24, Capacity 24" x 24") were *basically* designed for rapid and economical cut-off of BIG WORK. They are not merely "conventional" designs "stretched" to big capacity. They are truly designed and built with the ruggedness and rigidity necessary to withstand the rough treatment of sawing big work, even though the work is in the "toughest of the tough" alloys.

They are reliably fulfilling the cut-off requirements in innumerable steel mills, forge shops, structural shops, warehouses, and machine shops, with assured low tool cost and minimum kerf loss of steel.

In addition to cutting-off, they are reducing costs by eliminating further machining operations. Heat treated die blocks are being reclaimed for re-sinking by sawing off the worn face; columns, beams, pipe, and tubing are being sawed to *finished*, square ends, eliminating milling; angular sawing is done conveniently by swinging the upper structure on the base, to any angle up to 45 degrees—*without moving the work*.

Contemplating the modern trend toward ever tougher steels and larger sizes, these are the logical sawing machines to buy, not only for today's needs but for tomorrow's as well.

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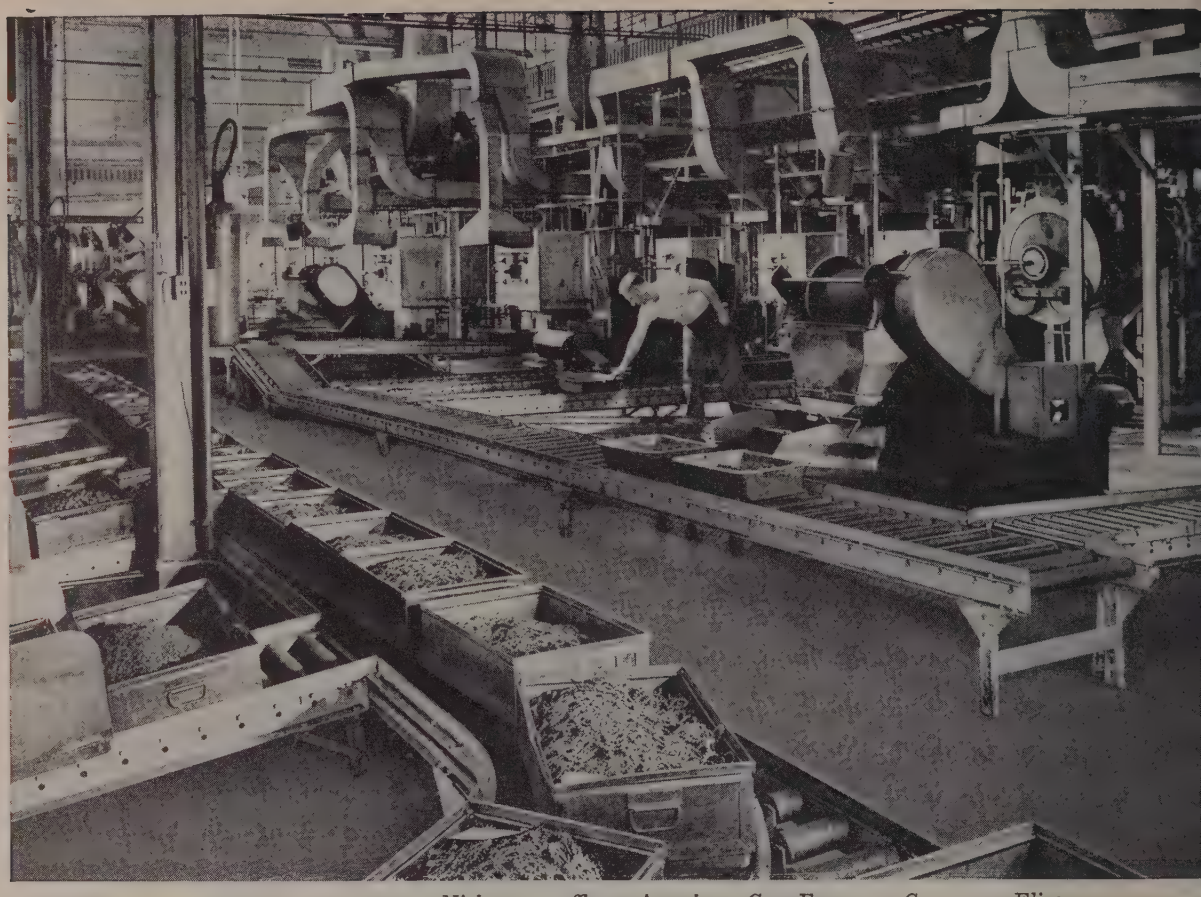


At low heat-hour cost ... Nichrome muffles give thousands of hours of high temperature service in gas furnaces manufactured by the American Gas Furnaces Company, Elizabeth, N. J., in operation at plant of Shakeproof Div., Illinois Tool Works, Elgin, Ill.

Nichrome muffle ... able to handle corrosive gas for 5½ years at 1600°F

HANDLING A CORROSIVE MIXTURE of city gas and ammonia, a Nichrome muffle used for heat treating small steel parts completed 36,732 hours of almost uninterrupted service at 1600°F.

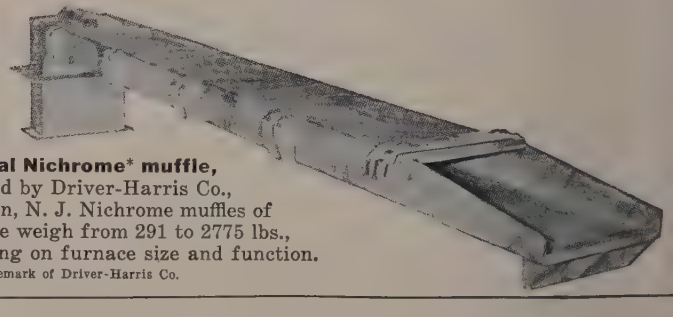
But this temperature is no severe test for Nichrome. Even at higher temperatures, under normal heating conditions you'll find little deterioration of this 60% nickel-15% chromium-iron alloy.

Actually, the big story about a Nichrome muffle is its ability to withstand "thermal shock." Shock from repeated alternate heating and cooling. And shock from intermittent charging of cold work.

Naturally, the 60% nickel content in Nichrome produces significant effects. For one thing, it improves load-carrying characteristics at elevated temperatures. Equally important, the nickel addition plays a major role in improving resistance to scaling from common industrial atmospheres.

That's why you find Nichrome muffles, retorts and other heat treating components used extensively for nitriding, for carburizing, for oxidation ... for handling reducing gas and for operations involving h temperature fatigue.

If you have a metal problem, w be glad to help with our wide pra cal experience. No matter what y industry, send the details of y difficulty for our suggestions. Wr us now.



A typical Nichrome* muffle, produced by Driver-Harris Co., Harrison, N. J. Nichrome muffles of this type weigh from 291 to 2775 lbs., depending on furnace size and function.

*Reg. Trademark of Driver-Harris Co.

INCO TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC. 67 Wall Str New York 5, N

Building Confidence

Americans plan to pour $44 billion into new construction next year. This tenth consecutive record for building expenditures will bring the postwar volume of new construction to more than $320 billion.

It would be difficult to overestimate what construction has meant to our postwar economy. Contract construction currently is giving employment to 2.7 million workers. That is four times the number employed in all forms of mining. It is nearly three times the employment in the automotive industry. It is nearly twice the number employed in processing food and kindred products. It even exceeds employment in the federal government.

As a consumer of steel and other metals, construction ranks a close second to the automotive industry. Nearly one-sixth of all finished steel shipped last year went for building and contractors' products.

A booming construction industry requires a heavy investment in machinery and equipment. New construction in place means a large market for furnishings, equipment and machinery.

High construction activity and good business go hand in hand. You are unlikely to see any major economic downturn while building activity is up. One reason why the readjustment in 1954 was so mild was the continuing improvement in construction.

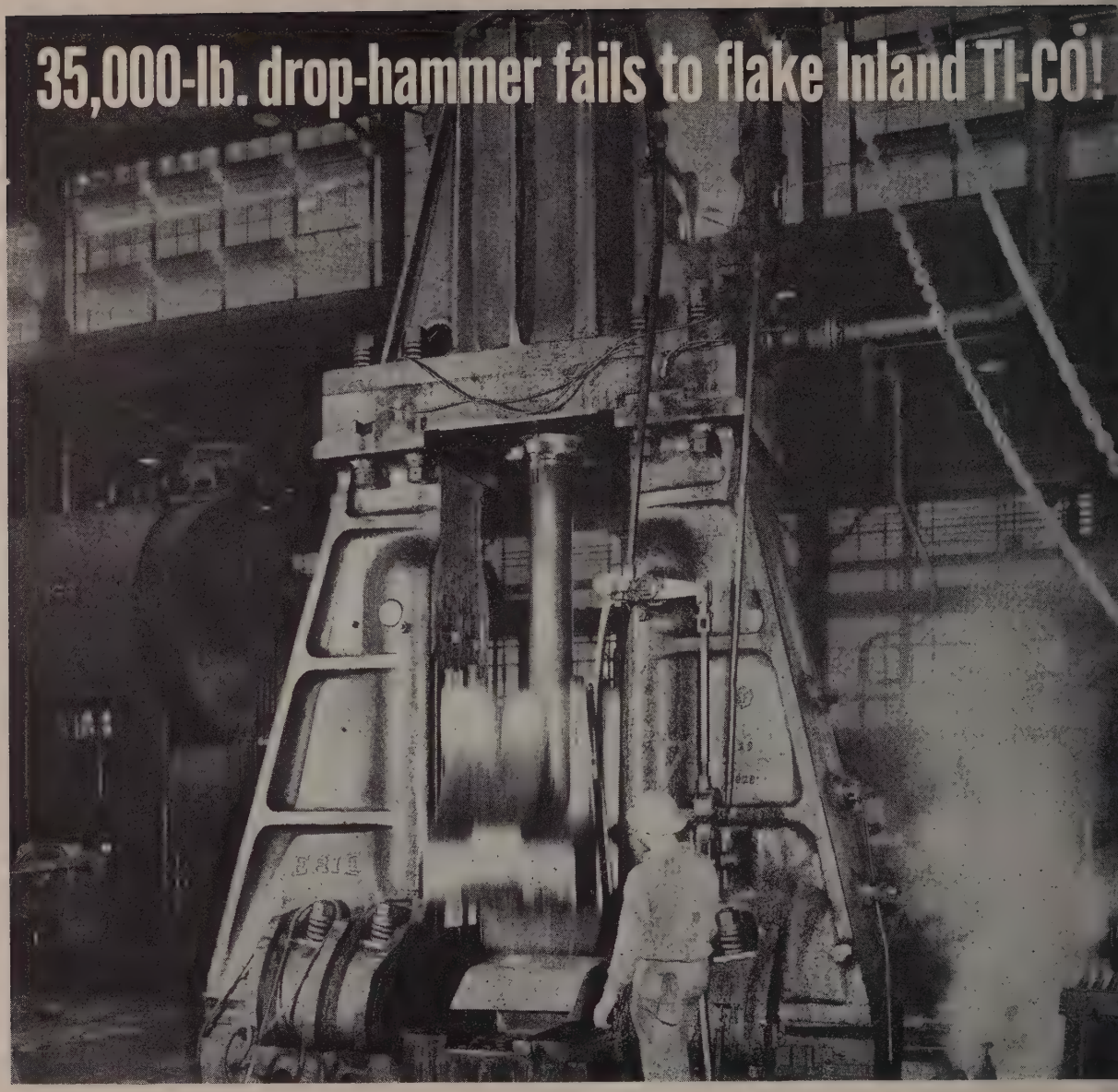
While construction expenditures estimated in this issue are for 1956 only, there is good reason to believe that building will continue to be active for several years to come. Industry is projecting large expansion programs that will require two and three years to complete. Highway and bridge building are a national must to accommodate the ever-increasing automotive traffic. There is a crying need for more schools and hospitals, and they will be built. Railroads, trucklines and airlines are calling for new terminal facilities and for construction by manufacturers producing the rolling stock. Atomic power development is coming up faster than was thought possible a year or two ago.

Add that old reliable of present-day economists—an upsurging population that requires a lot more housing—and you have a bright picture for construction in 1956 and several years thereafter.

Walter J. Campbell

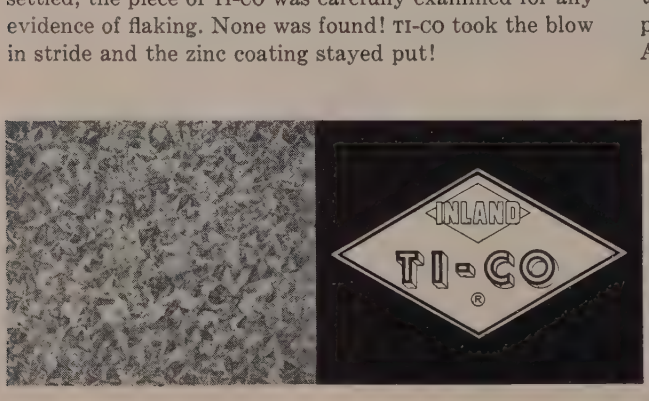
MANAGING EDITOR

35,000-lb. drop-hammer fails to flake Inland TI-CO!



The ability of Inland's TI-CO galvanized steel to take punishment without flaking of the zinc coating was recently put to the supreme test. A sample sheet of TI-CO was slugged with a lethal blow from a 35,000 pound drop-hammer, one of the largest in the world. When the dust settled, the piece of TI-CO was carefully examined for any evidence of flaking. None was found! TI-CO took the blow in stride and the zinc coating stayed put!

Unlike ordinary galvanized sheets, the protective zi coating on Inland TI-CO, produced by the patented Sen zimir process, will not crack, flake or peel when stampe crimped, double-seamed, brake formed or even wh formed by spinning. This flexible, uniform coating mea that products made with TI-CO are easier and cheaper produce because re-dipping after forming is eliminate And they stay serviceable and good-looking longer, t



It will pay you to specify Inland TI-CO for all your g vanized steel requirements. INLAND TI-CO . . . with zinc coating that rolls with the punch.

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rength in Structurals

RUCTURAL steel fabricators looking for a substantial inase in shipments next year. Their backlog of orders by Dec. will be 1.8 million tons, or 50 cent above the level of Dec. 1954. Bookings of new busiss this year will reach 3.4 miln tons, an increase of 45 per t over a year ago and the high- since 1929.

Supply Lack—Obtaining an adeate supply of plain steel from mills is the big problem of fabators. The shortage of sheet s limited their shipments in the t six months and will continue be a limiting factor during rly 1956.

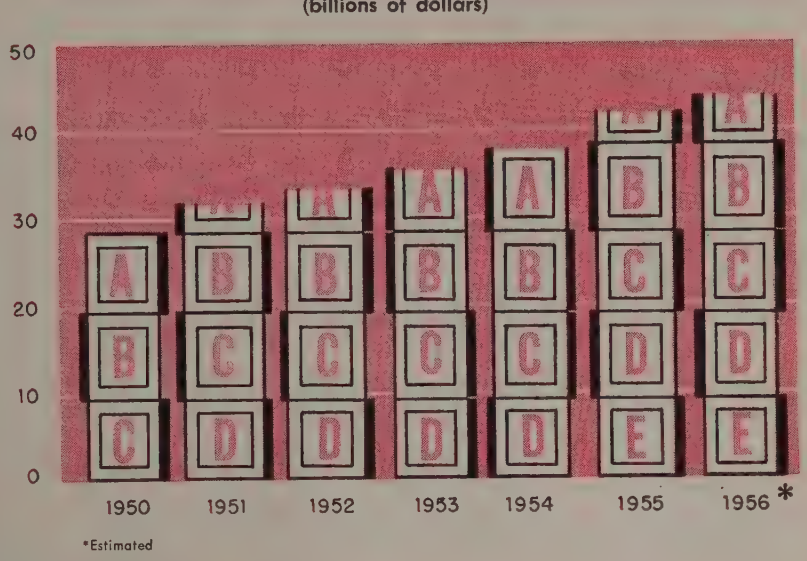
By mid-1956, new structural cacities will ease the supply situan, Earle V. Grover, president of nerican Institute of Steel Conuction, told members at the asciation's annual meeting at Boca ton, Fla., Nov. 28-31.

Future — "By mid-1956," says . Grover, "we will be able to k all our customers in the eye d promise a mutually satisfacy delivery date. Although our dustry is still on short rations, e end of our enforced starvation in sight."

Shipments in 1955 will be about million tons, down 8 per cent m 1954 and about equivalent 1951 and 1952, estimates L. Abtt Post, executive vice president the institute. The drop is due tirely to the inability of fabritors to get enough plain marial.

Prospects Rosy—For the long ll, fabricators see an extended a of good business.

Highways and bridges will proce a large and continuing volne. Industrial expansion, espeally in metalworking, will be on e upgrade. Utilities, atomic pow- plants, rail and truck terminals, hools and hospitals, multiple lev- parking lots and more suburban opping centers will provide oming markets for years.



In 1956, for the tenth consecutive year, we'll be . . .

Building for Another Record

CONSTRUCTION will be one of the nation's economic frontrunners again in 1956. Outlook: A $44-billion year for new construction, an additional $16 billion for maintenance and repair.

If new construction hits the predicted $44 billion—and it should—it will be 5 per cent higher than the record $42 billion of 1955. That means a record for new construction in every year since World War II. Next year's total will be one and one-half times that of as recent a year as 1950, will be double the 1948 total.

Big Prop—The buoyant effect that booming construction has on the economy is easily seen. The industry ranks a close second to autos as a steel consumer. It directly employs more than 2.7 million workers, double the number in the primary metals industry. It's estimated that construction accounts for one out of every seven dollars of gross national product. And $1 million spent on highways means use of 420 to 450 tons of steel.

Plans like these will keep the boom going: The auto industry has earmarked $1.8 billion for expansion in 1956. Steel will add 5 million tons of capacity next year at a cost of about $500 million. Much of that money will go for building.

Comeback—A year ago, economists were worried about industrial construction. Now it's looked to as one of the big upward forces in the building industry. Expansions like those of the auto and steel industry will push industry's outlays to $2.8 billion next year, 17 per cent more than 1955's $2.4 billion, estimate the Commerce and Labor departments.

Other heavy construction will have a big share in the construction industry's record breaking year. Commercial building (warehouses, offices, stores) will be up 14 per cent to $3.5 billion. Privately owned public utilities will spend about $4.5 billion, the same as this year. Increases by railroads (18 per cent) and telephone and telegraph companies (11 per

Looking Ahead with Optimism . . .

The construction industry, now rounding out its greatest year of activity, looks forward to further expansion in 1956. The year's total, including maintenance as well as new construction, may well exceed $60 billion.

H. E. Foreman, managing director, Associated General Contractors of America

1956 will break all previous records in new road construction.

National Electrical Contractors Association

We expect 1956 to begin at a rather slow rate, but the second half will be better; total housing starts shouldn't be off more than 50,000 to 100,000.

Harry H. Steidle, manager, Prefabricated Home Manufacturers Association

Over-all housing may be off, but we expect to build 120,000 homes in 1956, compared with 100,000 this year.

J. N. Robertson, president, American Road Builders Association

Preliminary estimates indicate electrical contractors should do a $4.5-to-$5-billion business next year; 1955 will be about a $4-billion year.

National Association of Home Builders of the United States

cent) will offset declines in oil and gas and electrical industry spending.

More Gains—Public construction will be up about 10 per cent, including gains of 12 per cent for highways, 14 per cent for military projects. Power and other facilities of the St. Lawrence Seaway development also account for a goodly share of the gain.

Spending for new housing accounts for over one-third of total new construction. Nonfarm housing starts may be down as much as 10 per cent from this year's 1.3 million, but that's still a lot of housing. And the houses that are built in 1956 will be bigger, better. That means more dollars spent per house; so dollar volume will be off only about 3 per cent from 1955.

Possibility — If the more optimistic estimates of next year's housing hold up, dollar volume could even better the record $14.8 billion spent this year.

Most estimators of housing starts say volume depends considerably on the availability of mortgage credit. But they're figuring the government will loosen credit strings if housing volume shows any signs of a prolonged slump. They're pretty sure politicians won't allow housing to fall off much in an election year, especially since present prosperity will be one of the major campaign themes.

Costs—Price hikes may account for as much as half of the dollar volume increase between 1955 and 1956. Builders are expecting both material and labor costs to go up but feel spirited competition will prevent them from passing on the full increase. Estimates are for a 1 to 3 per cent climb in the cost of finished construction.

Opinion is divided on raw material supplies. Steel and cement are the chief concerns. The most optimistic say supplies will be "adequate," while the majority expect to have some trouble, but not much more than this year. An indication of the strength of the construction market: Building firms say: "We could do 25 per cent more business if we could get enough steel."

Still Growing — That serves to point up the fact that constructi will continue as a strong bulwa in the economy for years to co Steel industry growth will avera about 4 million tons a year for t next 15 years. Aluminum capaci will double in that time. The au industry has billions of dolla worth of expansion planned just the next couple of yea Promising gains are evident in ele tronics and atomic energy.

It all means building.

In addition, a huge highway pr gram is a necessity and will po billions into construction over t next decade. Housing starts a expected to run over 1 million year through 1960, then rack phenomenal gains as the ba boom that began in the 1940s b gins to grow up.

Just Starting—St. Lawrence Se way activity is building up. Mu port improvement is necessary take care of a swelling volume trade coming over that route. supply the growing number homes and factories, the utility i dustry will have to continue ma ing huge outlays for plant a equipment.

The construction boom is ju getting started.

Alan Wood Expands

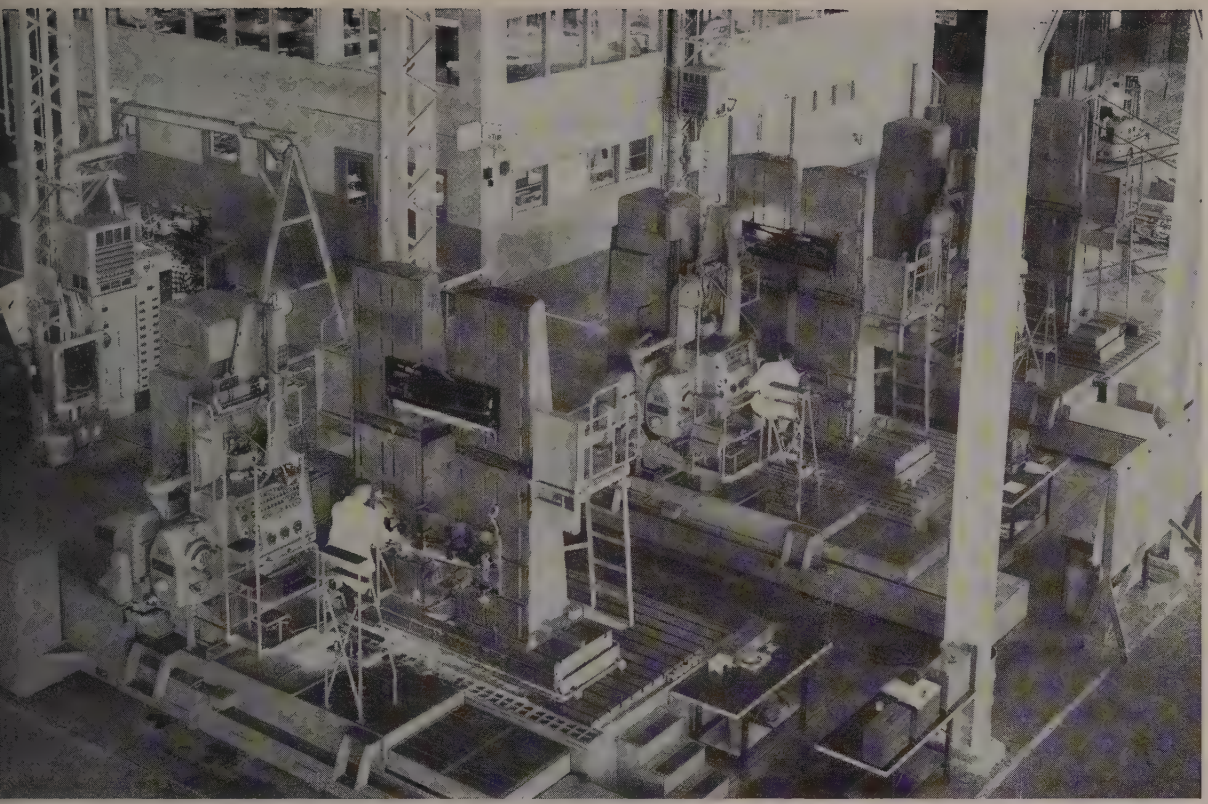
Steelmaking capacity will be i creased 19 per cent at Alan Wo Steel Co., Conshohocken, Pa.

The program includes a ne open-hearth furnace (together wi an improved cooling water supp system for the open-hearth depar ment), cold-rolled annealing faci ties and a cold-rolled temper mi About $14 million will be spent the next two years.

The open-hearth furnace (to completed next summer) will bri the company's rated capacity 800,000 tons a year—it's now 62 000 tons, but operations have be at a better than 675,000 tons year rate the last eight months.

The first phase of Alan Woo postwar expansion and improv ment was completed last yea Cost: $45 million for a 23 p cent increase in steelmaking c pacity, construction of hot a cold strip mills and modernizati of blooming and plate mills a other equipment.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*



Kaiser Mfg. Corp.

rofile millers like this may get the nod as . . .

Air Force Shifts Tool Plans

HE ARMED SERVICES' machine tool purchase program has fresh start.

The program originally called r $100 million to be spent on achine tools for stockpile. Of at amount, $84 million had been ced off for the Air Force. The rmy and Navy got the rest.

Economy Slash—To save money, e Administration decided to rap the program. Defense ofials also claimed that the tools ould be obsolete by the time they ight be needed.

By then the Air Force had obliated some $15 million of its cut d was negotiating for much of e rest.

Revisions—Now the Administraon has a new deal—less money d a program to buy tools for mediate use. The Air Force has en cut to $70 million, which includes the $15 million it has spent. This leaves it $55 million to buy new machine tools for active duty.

Most of the machines will go into planned production of aircraft, including airframes and engines. Other tools to be bought are: Skin millers, profile millers, knee and bed-type millers, vertical turret lathes and some horizontal boring machines.

Because of the cutback, some presses will not be purchased, and orders for a lot of skin millers will be canceled.

Joker — Most of the contracts will be let shortly—provided contractors don't change the terms already negotiated. If some of the machine tool builders want to up the ante on costs, the Air Force may have to look elsewhere.

Meanwhile, the Army and Navy are moving more slowly. No details of what they expect to buy have been announced.

U.S. Steel Boosts Some Prices

American Steel & Wire Division, U. S. Steel Corp., revised prices on carbon cold-rolled strip, effective as of midnight Nov. 30. Changes are being made in extras for size, straightening and cutting, in addition to a few changes in quality and chemical extras. Base prices on cold-rolled strip, in carbons 0.26 and over, are being advanced by $2 a ton. Packaging extras are being revised up and down.

U. S. Steel's Columbia-Geneva Steel Division and Tennessee Coal & Iron Division, announced certain changes in extras on carbon, high-strength and electrical sheet and strip products. Changes in packaging extras result in an over-all reduction in charges for that service. Dimensional extras for lighter gages of hot-rolled sheet are increased in amounts ranging from $1 to $3 per ton. The extra for special killed quality is increased $2 per ton for hot-rolled sheet and strip and $4 a ton for other sheets.

Hotpoint gets all management levels together when . . .

Keymen Solve Problems

WITH A BIG expansion program under way after World War II, Hotpoint Co., Chicago, faced three management problems:

1. Its management team had to be motivated to think in terms of a larger company.

2. A management development program had to be set up to provide qualified personnel for positions that opened as the expansion targets were met.

3. An effective two-way communications program was necessary to accomplish the expansion and still maintain profit levels.

Plan—Hotpoint top management formed its Keymen group. Philosophy of the program: Bring all managers—from foremen on up—together and expose them to all company problems, goals and achievements. They'll work more closely as an effective management team.

Hotpoint's Keymen represent operating management, middle management and executive management in all phases of company activities. Membership is gained only through recommendation of an individual by his department head and approval by the Keymen advisory board.

Heart of Program — Robert Westra, manager of employee relations, emphasizes: "Just telling them they're part of the management team isn't enough. They've got to feel it through active participation."

How's it accomplished? Through discussion meetings—both in small groups concerned with one particular operation and in general meetings of all 400 Keymen. Not only do Keymen learn about one another's jobs and departments, but they are expected to make suggestions for improvement in these other activities.

Take the management conference held in June. A three-day program was set up in a Chicago hotel, so that every Keyman had some specific task. The purpose was to discuss steps which could be taken to meet an outlined two-year goal and the long-range, ten-year goal.

Formula—All meetings, large or small, hinge on pyramiding or structuring ideas from every Key man to top management. Eac day 120 Keymen, eight to a tabl met. The program was schedule to discuss three major topics— products, production, people. Eac topic had three areas—produ quality, sales and cost of sale production materials, cost and a tomation; personnel relationship development and compensation.

Time Limit—One hour was a lotted to each topic. Each of th three subtopics was assigned five tables. Each table was r sponsible for discussion and wri ten conclusions on its assigne topic. On the final day, nine re resentatives (one from each majo topic each day) formed a panel discuss the written conclusions.

Result — Over 3000 suggestion and criticisms were submitte Screened and boiled down to om duplication, nearly 150 usable co clusions resulted. Final step: Pre ident J. C. Sharp gave produ general managers three months answer or put the conclusions in action.

Normally, only two or three ge eral meetings are held each yea While results from them are su stantial, officials state that mo can be accomplished in the sma meetings called to tackle a sp cific problem. "It's here that Ke men spot problems which fall d rectly into their laps. Then th stick their necks out on how they take action."

Results Published—As each Ke man group conducts a discussi meeting, a report on the topi covered, highlights and conclusio are printed and sent to all Ke men to keep them current on a tivities throughout the compan

Another communications featu is the Keymen management lette In this letter (Kiplinger style company activities are outline business reports given and troub areas discussed. The idea is th Keymen should be looking for po sible corrective measures in the own realm of activities.

Local Leaders—Keymen also a expected and encouraged to leaders in their community life. high percentage are active in ser ice clubs like the Junior Chamb of Commerce, Junior Achievemer Community Fund and other pr

Like knights of old, Hotpoint Keymen meet at the roundtable to discuss ideas

rams. Also being developed is a Keymen speakers bureau which ot only promotes Hotpoint good-ill, but helps develop the Key-nan as an individual.

Hotpoint estimates the cost of ts Keymen program is about $100 er man annually. "No amount of noney could give us the esprit de orps in our management that this rogram delivers," says Mr. Vestra. "It's been a major factor n Hotpoint's growth in the past en years to one of the nation's op appliance makers."

GE Builds Better Lamps

General Electric Co. has re-amped its lamp bulbs to increase ight output 6 to 15 per cent with-ut using more electricity.

The greatest improvement is in ndustrial-size lamps (750 and 000 watts). The 750-watt bulb vill produce an average of 21.6 ight units for each watt of elec-ricity consumed, compared with he 18.9 lumens it now puts out. GE says the large bulbs are im-nediately available.

Vernet C. Kauffman, manager of GE's engineering department, ex-plains the increased light output omes from:

Improving the tungsten filament, ltering mount structure so the ilament is set lengthwise in the ulb and substituting double coiled ilaments for singly coiled ones in amps of 300 watts and up. Double r "coiled" coil filaments formerly vere used only in household bulbs.

GE reports: "This is the great-st single improvement in incan-lescent light bulbs in 42 years."

Jorgensen Buys Baker Steel

Earle M. Jorgensen Co., Los An-geles, purchased Baker Steel & Tube Co., that city, distributor of steel and aluminum tubing.

Bryant Builds in Indianapolis

Carrier Corp., Syracuse, N. Y., s constructing an administration nd engineering research building t 2020 Montcalm St., Indianapolis, s the national headquarters of its Bryant Division, producer of home heating and cooling equipment, water heaters and boilers.

Accounts receivable may provide the answer if you . . .

Need More Working Capital?

THIS year, some $6 billion in new working capital will flow into industry from accounts receivable financing.

This device is one of several ways in which metalworking can turn headaches into assets. (Another, field warehousing, was covered in STEEL, Mar. 21, p. 74.) Here's how accounts receivable financing works:

Cases — An agricultural implement and machinery manufacturer was doing a business of $1 million a year, and had $200,000 tied up in accounts receivable. If he could raise $140,000 additional capital, he could handle a $1.6 million annual volume. Short-term borrowing was not the answer, since he needed a permanent increase in working capital. He didn't want partners, and flotation of a security issue was prohibitive.

A commercial finance company —Standard Factors Corp., New York—was assigned all the manufacturers' accounts receivable. It then advanced payment of $180,000 to the manufacturer (90 per cent of the face value of the security). The manufacturer had his $140,000, with $40,000 to spare. He continues to bill his customers and collect his invoices, and he has built volume up to his forecast. As fast as fresh sales are made, the commercial finance company will make further cash advances if required.

Costs — On a simple interest basis, accounts receivable financing is usually more expensive than bank credit. But dollar for dollar, it may often cost less. Since accounts receivable companies charge interest on a daily basis, if the manufacturer doesn't need the cash for the full month, he comes out ahead as opposed to a 30-day bank loan.

Republic Adds Culvert Plant

Republic Steel Corp. will build a plant near Harrisburg, Pa., to produce riveted, corrugated-metal drainage products. The Culvert Division of Republic Steel will operate it, says Ernest R. Johnson, vice president of operations.

Expected to be in operation next spring, the unit will have facilities for the production of plain galvanized and asphalt coated drainage structures. Initial employment will be less than 100. Republic will acquire nearly 6 acres of land for possible expansion.

Engines: Power for Industry

Industrial units come into their own as work horses on the farm, in the factory and for construction. Reason: Rising need for portable energy

SHORTLY after World War II surplus engines came into use for irrigation purposes. As demand mounted and the supply of war surplus engines dwindled, a Texas Plymouth-Dodge dealer contacted the Marine & Industrial Engine Division of Chrysler Corp. Its engineers developed a special engine capable of delivering an average of 1250 gallons of water a minute from wells hundreds of feet under the ground. In the succeeding ten years, Texans have bought more than 27,000 Chrysler irrigation engines, which currently account for 25 per cent of the division's production.

That's only one example of the growing field for industrial engines. The list includes portable welding equipment, fruit sprayers, transit concrete mixers, petroleum pipeline gathering pumps and oil well pumps. In fact, just about any portable power application you can name finds industrial engines on the job. Though companies like Continental, Hercules, LeRoy, Detroit Diesel, Caterpillar and others have been in the picture since prewar days, there seems to be common agreement that the market today is many times the prewar size.

War Influence—A major factor was the war itself. Lift trucks, cranes and shovels soaked up industrial engines in plants while the military used them in such vehicles as aircraft towing tractors and self-contained jet engine starters. Meanwhile, a trend toward more specialized equipment, such as motorized combines and corn pickers, was starting on the farms.

The result has been a sharp growth in industrial engine sales since the end of the war. Companies like Ford, which entered the field in 1947, have found the trend line continuing up. Unfortunately, statistics on growth of the market are hard to come by. A major factor is the lack of uniformity on what is an industrial engine. To some, 1-horsepower jobs, such as those found on lawnmowers, qualify. Others figure multicylinder units only should be counted.

Developments — On the trend line, however, there is agreement, and the manufacturers are doing their bit to help the upward climb. Accessories like torque converters, hour meters, power takeoffs and special carburetors for operation on LP gas or natural gas help adapt the engines for their various duties. Chrysler figures about 360 distinct engine model combinations can be supplied. And Chrysler sales are up about 21.9 per cent in the first nine months of 1955 over the like period of 1954.

One company shortly will announce the establishment of franchised dealers, but one source estimates that about 75 per cent of sales are to manufacturers of equipment. They install the industrial engine in their products, which range from fruit sprayers to lift trucks.

Work Horse — Auto companies like Ford and Chrysler can use many basic components interchangeably with passenger car engines. But special manifolds, carburetors, sodium-cooled valves and other parts may be added. There's a direct analogy between race horses and work horses in the passenger car and industrial engine field.

And somewhat analogous, too, is the fact that while the race horses get the glory, these work horses are doing plenty behind the scenes.

New Restrictions on WOCs

President Eisenhower has put new restrictions on WOCs.

The executive order aims at reducing the opportunity any consultant might have to aid companies in which he has an interest.

It stems from an amendment to the Defense Production Act which deals with "conflict of interest" regulations for those persons serving U. S. without compensation.

The order:

Limits the function of consultants to advising government officials. They are not allowed to make recommendations.

Prohibits nonsalaried experts from making recommendations concerning any business in which they or their private employer might have even an indirect interest.

Requires the employing govern-

The auto companies, such as Chrysler, move deeper into field

ent agency to tell specifically
y it cannot hire a full-time,
aried consultant.
Asks each WOC appointee to file
financial statement and business
story in the *Federal Register*. It
ust include any private affilia-
ns the man has had 60 days
or to his appointment. WOCs
o must file statements every six
nths concerning any changes
their business status.

Merger Matters

ntitrust chief says he'd try to eed court decision on proposed thlehem-Youngstown marriage

FFICIALS OF Youngstown Sheet Tube Co. and Bethlehem Steel rp. have another helpful hint on eir proposed merger.

Stanley Barnes, Department of stice antitrust chief, recently de-ared that he will try to speed up court decision on the legality of e merger if and when the two ms decide to try it.

Suit Threatened—Attorney Gen-al Herbert Brownell already has ated that the Justice department ll bring immediate suit against e companies if they attempt to in forces.

Both companies fear that a legal st of the Clayton Act amendment nder which Mr. Brownell be-ves the merger is illegal) would ke six to ten years. In that ne executive personnel and eco-mic conditions might change, aving the expansion program of th firms stymied.

Short Timer—But Mr. Barnes timated that an antitrust trial uld be concluded in about three nths—after the companies file answer to the charge. He indi-ted he probably would file the se in federal district court in ttsburgh or Cleveland.

Legal observers have pointed out at even if it were possible to get district trial that quickly, it ight take more months for the dge to render a decision and ars before all appeals were ex-usted. After that, some stock-lders also might file suit.

The two steel firms have been ying to get a three-man federal urt to hear the case. They feel is would speed a decision.

Inland Steel Co.

Steel Strapping Wraps It Up

MAKERS of steel strapping are enjoying hefty sales this year, and they think 1956 holds promise for continued gains.

Heavier demand from the record-breaking steel industry has been a major factor in the increased business. Strapping operations approached 100 per cent of capacity in much of 1955, but throughout the latter part of the year the steel shortage has been reducing output.

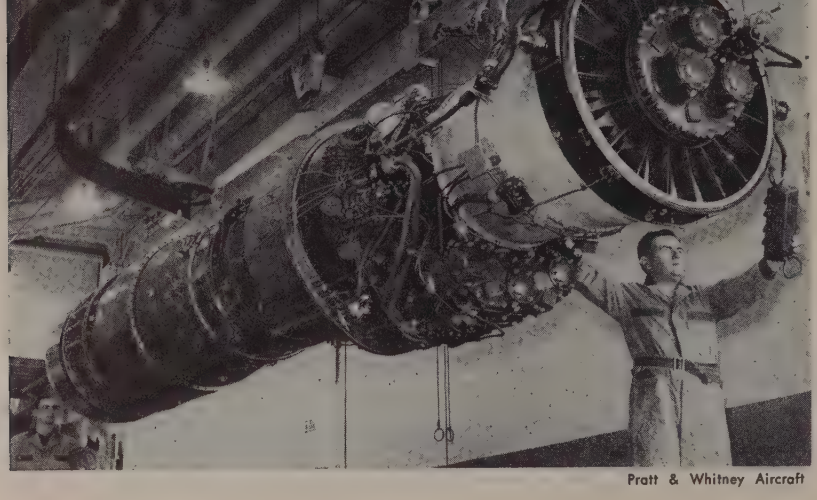
Good Business—About 15 companies are in the strapping industry. Some set production records this year, topping previous marks as much as 46 per cent. Since 1954, it's estimated that the industry has shared in a business gain which averages between 10 and 15 per cent.

Less than half the companies produce or process their own strapping. The bulk of it is flat strip or round wire, both of low-carbon analysis. There is increasing use of cold-rolled, high-carbon, heat-treated flat strapping in larger sizes. Its use grows out of the trend toward larger and heavier packages for shipment.

The Trend—A few firms which distribute round wire strapping have been showing interest in an oval wire and have developed tools for its application.

The steel industry is the biggest consumer of strapping and is followed by such industries as nonferrous metals, automotive, agricultural and heavy machinery, lumber, paper, chemicals, textiles, etc.

Many firms within the last year or so have introduced powered strapping machines. The sale of tools and equipment for applying strapping is on the increase. But, most of the apparatus is leased.



Pratt & Whitney Aircraft

Bigger jet engines, one spur to Defense department's . . .

Search for New Alloys

INDUSTRY has its work cut out to keep pace with a growing need for new and better high temperature alloys.

Complicating the already knotty problem: 1. Bigger, hotter jet engines and power plant steam turbines requiring greater amounts of such alloys. 2. The probability that critical materials needed to produce them (nickel, chromium, cobalt among others) will become scarcer than they are.

Supply Lags—G. A. Tinker, deputy assistant defense secretary for applications engineering, says new discoveries, improvements in methods of extraction and development of substitutes are lagging growing demand for the materials, particularly high temperature alloys.

"One saving feature in the situation" is pointed to by Dr. J. B. Macauley, deputy assistant defense secretary (research and development).

Flexibility—He says: Experience during and since the Korean War indicates that supply of at least some scarce metals used for high temperature alloys is more flexible than was supposed.

Columbium, for example, was at the top of the list in 1952 as our most scarce metal—in terms of mobilization demand in relation to supply. Tight restrictions were placed on its use; a large price incentive was offered to increase production.

Double Benefit—Results: 1. Use of columbium in jet engine metals greatly diminished; it was found that it could be almost eliminated, if necessary, without adverse effect on the engines. 2. The bonus price resulted in the discovery of big columbium deposits. Now the metal is in oversupply.

Tungsten is another metal that was short in 1952. Aided by bonus prices, it is in oversupply.

Progress—Ways to stretch tight supplies, says Lt. Gen. C. S. Irvine, deputy chief of the Air Staff (Material), are to cut back on scrap losses and to develop substitutes.

Some progress is being made:

1. Precision forging offers promising savings in scrap and fabrication costs. Savings up to 50 per cent in materials have been obtained by using heavy press forgings rather than the conventional hog out methods of fabrication.

2. Cold forming techniques, including flow turning, with st have allowed considerable savin in some rocket and jet engine uni

3. Much progress has been ma in developing aircraft quality ca ings. It's expected that select components redesigned as castin will achieve a weight reduction 10 per cent, eliminate many cos machining operations and all wider choice of aircraft structu materials.

Improvements—Use of substitu materials like titanium and prot tive coatings (including ceramic have helped bring about some ductions in the use of critical m terials even in the face of high thrusts and temperatures.

General Irvine points out that about four years columbium quirements for Air Force engi have been reduced an average over 50 per cent; tungsten, abo 50 per cent; cobalt, about 50 p cent; chromium, about 5 per ce nickel, 35 per cent.

New Trick — One of the m spectacular developments in jet gine fabricating techniques is i forging of turbine blades, parti larly long titanium blades in new engines.

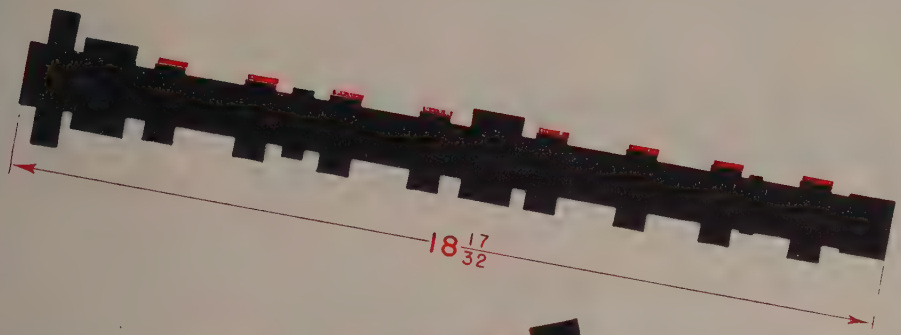
We expect, the general says, produce items to final finish a tolerances without grinding machining. The technique in cates big savings in machini time and costs and a reduction chip losses.

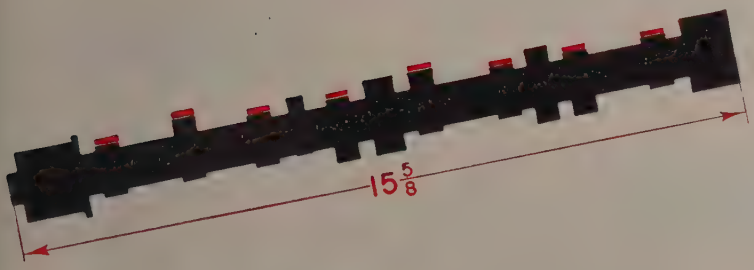
With continued developme techniques in precision forgi flash welding and fusion weldi hold promise for the future of gines.

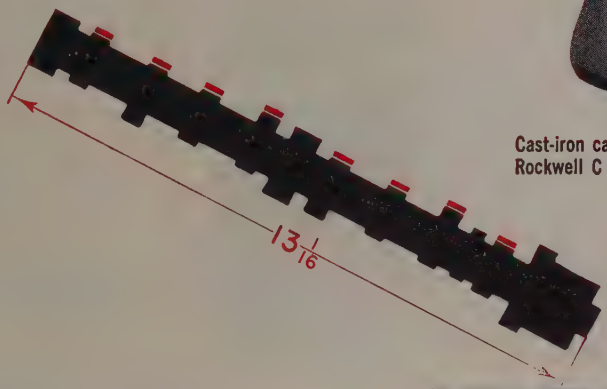
Here and There

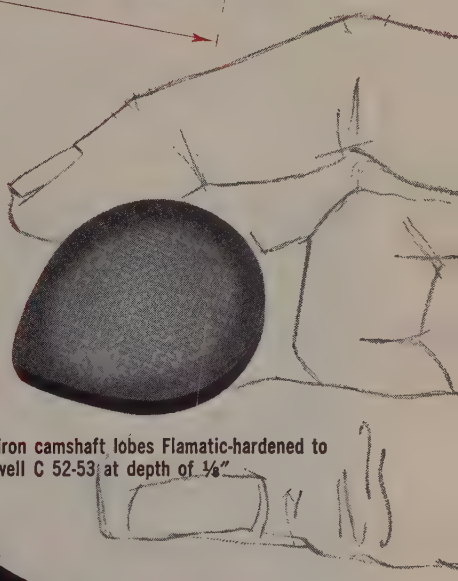
Internal Revenue service w hold public hearings Dec. 19-20 proposed depreciation rules re sions (they deal with useful li method of computing depreciati etc.). . . Rear Adm. H. G. Ricko suggests a way industry might lieve the technician shortage: dustry (at its own expense) wo supply scientists and engineers teach in high schools and u versities for one-year periods. T cost, he says, will be more th repaid. More and better trai students would be available.

1 flamatic hardens 3 different camshafts









Cast-iron camshaft lobes Flamatic-hardened to Rockwell C 52-53 at depth of ⅛"

THE drawings above show the three camshafts that a large automotive manufacturer asked Flamatic to harden selectively on a single machine. The close-up at the right shows how Flamatic flame hardening solved the problem through simple, ingenious tooling. The machine achieves high production, yet set-up changes take less than 15 minutes. The operator positions the water-cooled shield, sets the selector-switch for the proper flame head, and adjusts the work-holding fixture. The cycle is then automatic except for loading.

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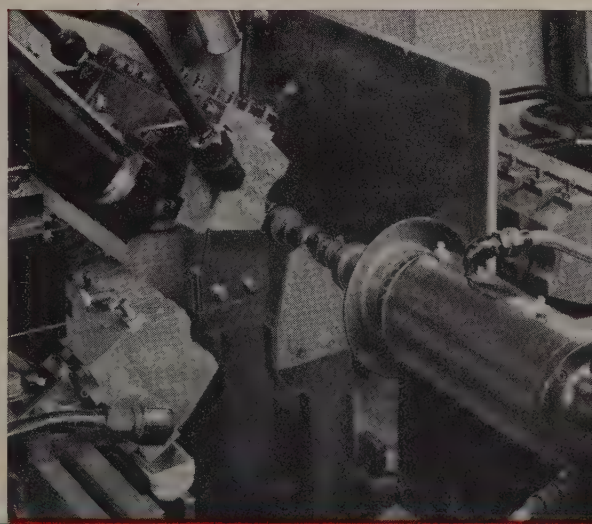

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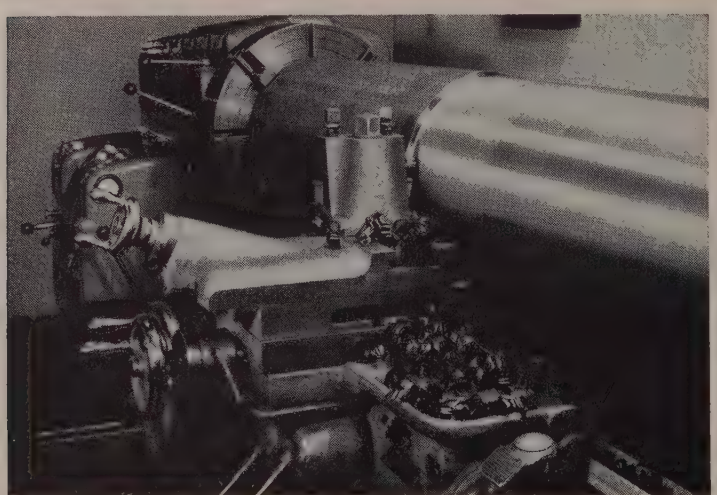

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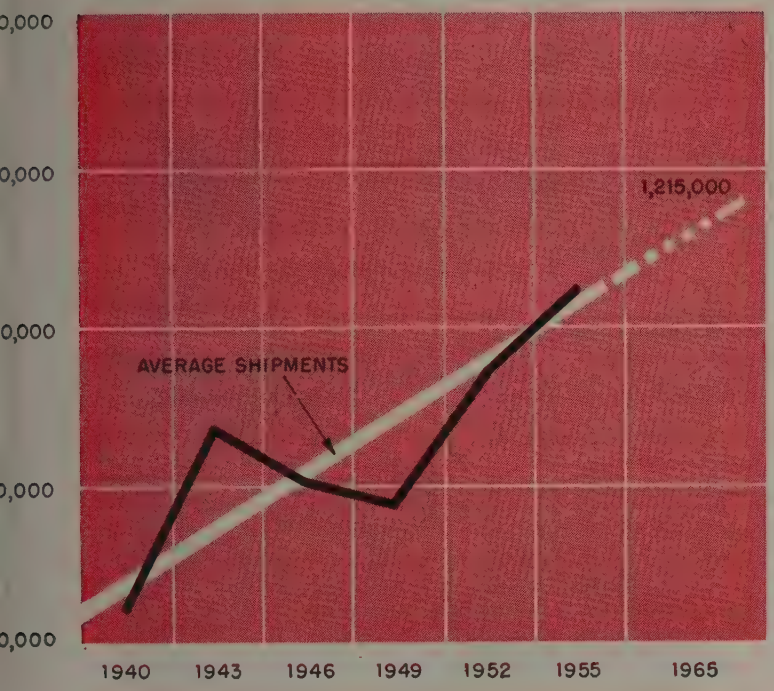


estimated by STEEL
d line computed by STEEL's Market Research Dept.

utos and new technology boost output as . . .

Malleable Nears Record

ALLEABLE foundries are work- on a record year, but "the in- stry is in trouble when orders op," a Cleveland foundryman be- ves. "It can't operate at 70 per nt of capacity and still make a ofit as the steel industry did in 54."

Material and labor costs are up, d have prompted price increases anging from 2 to 10 per cent) s year. Most of the increases verage, about 8 per cent) came July and August.

Malleable founders still feel that eir profits are not adequate. One dwestern operator predicts an- ner upward adjustment will be ade in six months.

Inevitable—There is a trend to- ard larger foundries and an ac- mpanying reduction in the num- r of malleable shops.

Gunite Foundries Corp., Rock- ford, Ill., quit malleable production after 91 years in the business. It is concentrating on gray iron and steel castings. D. P. Forbes, presi- dent, says: "The (malleable) busi- ness was unprofitable 90 per cent of the time."

Volume—In the first nine months of this year malleable founders produced 814,683 tons of castings. At this rate, shipments in 1955 will hit 1,090,000 tons, passing 1951's all-time high of 1,085,241 tons. Model change-overs in the auto industry may pare down to- tals about 15,000 tons.

Sunny Side — Unfilled orders (123,473 tons in August) are at their highest in two years. Many jobbing shops have backlogs of two to four months.

Buyers of castings are not load- ing up with inventory. Orders are on the basis of need. The short- age of steel is one reason. Pur- chasing agents see no point in having more castings than steel on hand.

Inventories are near the 1953 level. In 1954, as one foundryman put it, buyers tried to operate without any inventory at all.

Looking Ahead—The first half of next year should see no letup of the present pace. Sales, if they don't match this year's, will come close—within 5 per cent. A lot depends on the malleable founders' chief customer, the automotive in- dustry.

The Future—Expansion in the consuming industries — including autos, trucks, railroads, farm im- plements, pipe fittings and plumb- ing parts—will call for about 1,- 215,000 tons of malleable castings in 1965. Two developments in the foundry industry will help.

Pearlitic malleable jumped from 27,401 tons in 1945 to 84,548 tons last year. This year's production will be about 170,000 tons, esti- mates the Malleable Founders' So- ciety, Cleveland. Outlook for next year: 200,000 or more tons. Cal C. Chambers, president, Texas Foundries Inc., Lufkin, Tex., says: "We feel that a potential of 250,- 000 to 500,000 tons per year exists."

Shell molding is just getting started in the malleable industry. Link-Belt Co.'s malleable foundry in Indianapolis makes 180 molds an hour. This year will see the introduction of automotive crank- shafts made of a shell molded pearlitic malleable.

Westinghouse Orders Higher

Westinghouse Electric Corp. looks for sales of $1.6 billion in 1956.

That's about what the company expected to make this year, ac- cording to George Main, treasurer, but the current strike upset its plans.

Orders so far this year are 10 per cent ahead of last year's, with defense orders down 9 or 10 per cent. Heavy apparatus bookings are running 25 per cent above 1954's. Consumer goods orders show a 10 per cent gain.

NEA

Italian autos roll as these Fiat 600s head for dealers in R

Boom in Europe—

Italy . . .

IN BOTH America and Italy, gross national product this year will be up 6 per cent from 1954. Italy's GNP in 1955 will be $20.9 billion. In America, steel production will be up 31 per cent since 1954; in Italy, 39 per cent. Italy produces 6.4 million tons of steel.

Leaders — Metalworking industries have sparked the advance. Steel capacity is being expanded and modernized with U. S. money and know-how. The government-controlled Finsider group has the latest continuous equipment, including a 6-stand, hot-strip mill, a cold mill and a galvanizing line. A new, Ferrostan, electrolytic tin plate line is on order.

Large offshore procurement programs are another form of U. S. aid to Italy. Not only do they boost the economy, but they also help lever communists out of the labor unions. No U. S. orders are let to companies with communist unions.

Costs—Italy is trying to expand steel exports, but prices are 15 per cent above world levels. However, Dalmine S. A., a Finsider affiliate, exports about 40 per cent of its tubular products output, some to the U. S. and Canada. It has warehouses in Los Angeles, Houston, New Orleans and Edmonton, Alta.

Italy's participation in the European Steel and Coal Community has contributed to lower steel prices—benefiting home consumers but posing real problems for the less efficient steel producers. By 1958, when ECSC members will establish free markets, they will have to reduce operating costs substantially to stay in business.

Discovery of a huge, high-pressure gas field at the foot of the Alps has given a big lift to industry in the Genoa-Turin-Milan triangle. It's even being used for open-hearth fuel. In Sicily and on the Adriatic coast in the so discovery of high-grade oil (v the help of Gulf Oil Co.) will fuel-hungry Italy.

Development — Boosted by certed efforts to cut produc costs, oil and natural gas in tries are making continued ga A network of gas lines is spr ing across the industrial north. its wake—increased consumer mand for gas appliances.

Gas equipment makers are panding as fast as possible. plants are mushrooming. North Milan, 300,000 sq ft of produc space are being tailored to out water heaters, stoves, air ditioners, refrigerators and me for the domestic market by year. The only limits on the sp of this expansion are strict im quotas on machine tools; delive are extended up to two years. purchasing power of the Ita consumer, especially low in the pressed south, is the only limit its size.

Answers—As long as Italy m import much of her produc equipment, it's unlikely that balance-of-payment problem

completely solved. During 1955, deficit has increased by about 0 million. But Italian metal-rking products can be exported competitive markets. Because the labor factor and advanced ign, Italian business machines ve made a dent in the American rket.

To rebuild depressed areas, Ital-s are relying on programs like Cassa del Mezzogiorno, a vast blic works scheme partly nced by American aid. The ssa's annual budget is equiva-t to $175 million.

Despite the built-in economic blems, however, the immediate look is for continuing gains. ere is a new air of independence d confidence in Italian business, nifested, for instance, in Fiat's ntract for the Westinghouse mic generating plant.

weden . . .

OW far should you clamp down inflation? Here, we're still not e. Sweden was in the same spot months ago. She found an swer.

Sweden's boom started at the ginning of 1954. Last January, en Swedish wallets were fat-ed by a big wage hike, the sit-tion began to get out of hand. early spring, consumers were a spending spree. Though in-sting at breakneck speed to boost oduction in line with demand, nufacturers were falling behind.

Squeeze — The Swedish govern-nt clamped down during the ond quarter. Heavy taxes were on automobiles. Since the war, eden's car count has jumped m 1 for every 70 persons to 1 every 10. Aimed at reducing siness exuberance were new es on investment and corpo-e earnings. Results: The boom tamed, but not killed.

Manufacturing employment will up 15 per cent from 1954's. In talworking, employment will be 6 per cent, and there'll be a 3-r-cent productivity gain due to reased mechanization. Volvo ., which makes most of Sweden's rs, trucks and busses, has upped tput to 60,000 units a year. In spite of heavy tax penalties, domestic auto registrations should equal 1954's record.

Balance—Sweden's exports also gained. Through August, value had gone from $266 million to $282 million, compared with last year. The increase is due largely to metalworking. More than 90 per cent of Swedish ore is exported, and mines have been producing at capacity through the year. Output is up 10 per cent from 1954's.

Shipyards, too, have been working at capacity. Tonnage will be up 15 per cent from 1954 for an all-time high.

Swedish imports were up 14 per cent through the first half. Most of the gain came from a 42-percent increase in imports from the U. S. Inflow of autos, auto parts, machinery, coal and lubricants was stepped up. Meanwhile, exports of Swedish dollar earners like wood and iron ore fell off.

Planning — Swedish economic planning has a way of working out. The last round of steel expansion was completed just in time to save capacity from being completely swamped by domestic demand this year. Even though production is up 25 per cent from 1954's, imports had to be lifted 20 per cent above normal. It's almost certain a major new expansion is coming.

Planning is helped by the fact that the Swedes sit on top of a gold mine—the only source of high-grade iron ore in Europe. Germany and Great Britain, the major importers from Sweden, get most of their ore from her. Coming up may be a new concentration on dollar markets for manufactured goods, to replace the lost wood-products market. One sign of the times—Volvo last month announced it was entering the American market.

These articles begin a series on the economic outlook in major European countries. Next week we will cover Belgium and France.

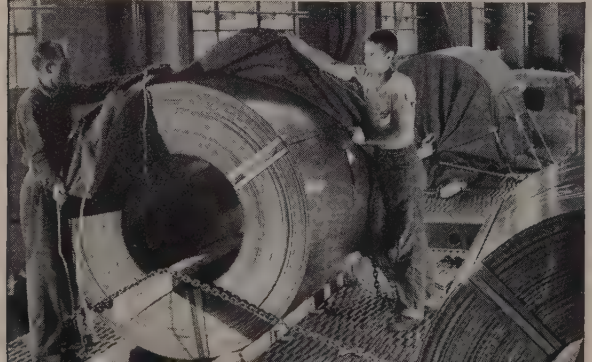
Sweden boosts its automotive output, too

This new type of railway car is designed for maximum protection of steel coils. It is being used experimentally by Great Lakes Steel.

How Great Lakes Steel *delivers* quality

Another order receives individual attention as sheets of steel are wrapped with a waterproof covering and banded to meet the customer's specifications.

Steel coils (below) are securely blocked on a truck and trailer at Great Lakes Steel. Heavy tarpaulin cover is provided by truckers as standard equipment for additional protection.



The emphasis on quality at every stage of proc
tion at Great Lakes Steel extends right on thro
to the Delivery Department. There, careful at
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and bundle to make sure that the customer rece
his order in prime condition.

The Delivery Department has another impor
responsibility, too. It must see that our prod
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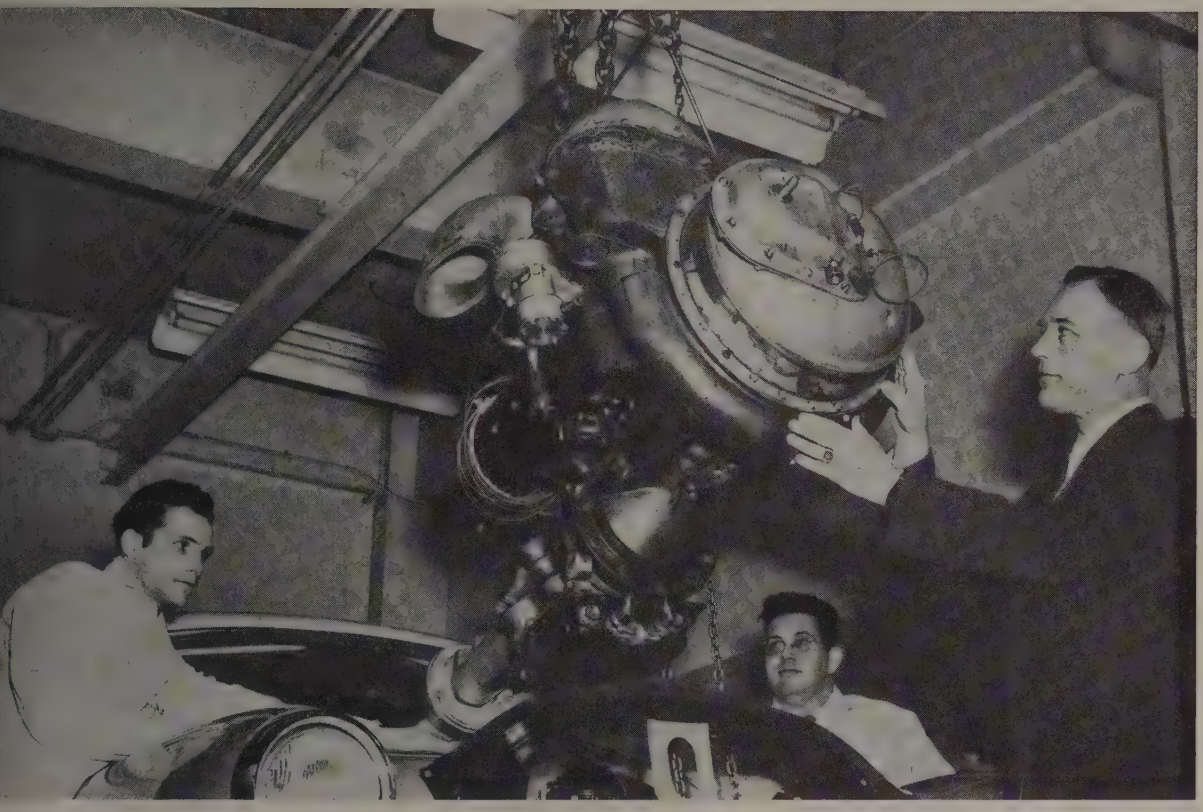

est units, like this Chrysler, move closer to production as . . .

Gas Turbine Race Quickens

ACHINERY SUPPLIERS are signing equipment to build the s turbine auto engine.

A company hitherto associated th machine tools, is developing automatic investment molding achine at the request of a ma- r auto company. Described as a achine using plastic for the in- stment medium, it would pro- ce molds, pour an austenitic al- y and eject turbine blade cast- gs ready for further processing.

New Problems—Also under de- lopment by another supplier is machine to automatically bal- ce completed turbine wheel and aft assemblies more precisely an mass production ever de- anded before. Rotational speeds in the compressor unit in excess of 40,000 rpm give an idea of the problem—the reciprocating engine develops 4500 (or so) rpm.

Yet another area of equipment work is roller bearings. Turbine lab men report they will have to produce class-5 roller bearings in quantity at about the price they pay for less-finicky, class-1 bearings. Now under development is equipment which has that major feat as its objective, however much a price cut to such a fraction may jolt bearing makers.

For Example—For those who say it can't be done, automakers point to such examples as the fluid coupling, which when introduced in Europe cost several hundred prewar dollars to manufacture. One automaker today estimates his cost for a comparable part at about $4, a much greater reduction percentagewise than the bearing target. And when you speak of cost reductions, what about the cost of the gas turbine power plant as a whole, compared with reciprocating jobs?

Never a theoretically intelligent way to power a vehicle, the bang-and-wait cylinder engines of today are shaping up as similarly inefficient in the cost department as turbines come into focus. One reliable source predicts confidently that the turbine power package ultimately will total about one-half present engine costs when you take into consideration such factors as these: Elimination of the radiator, complex transmission and the multiplicity of load-and-fire parts in the reciprocating flintlocks of today.

Evolution—This, it must be em-

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phasized, is a target, and undoubtedly the first turbines to hit the road will be premium items introduced primarily for their prestige value to the automaker. From a "limited production" feature they will move into the optional equipment status before finally evolving as standard equipment. That will cover a number of years.

How will the turbine be made? You'll find plenty of disagreement among companies on specific parts, but there are trends in evidence. Turbine blades, for example, previously considered a forging job because of the military experience, seem definitely headed for casting. One company says it's holding out for investment casting to get proper surface finish and dimensional tolerance control. But Ford's Donald N. Frey, associate director of the scientific laboratory, claims shell molding looks like the best bet.

Costs—Speaking before the investment casters recently in Detroit, Dr. Frey cheerfully reported investment castings would have to be produced at one-third their present cost to be competitive. Specifically, he announced that turbine blades would have to merchandise for 15 cents a copy (maximum), which drew a turbine-like noise from his audience. Stack molded in shells, Ford rocker arms presently cost about 2 cents each and are produced in sizable quantity. Dr. Frey sees no barrier to similar production of turbine blades, and within the cost target.

Production of the turbine wheels in aircraft turbines today is done by machining the root of the blade and fitting it into a machined or forged slot on a forged rotor. This, Dr. Frey feels, is prohibitively costly for automotive use. Cast blades will have to be attached to the rotor by welding or brazing or by a second casting process whereby the rotor is cast onto the assembled blades. This latter technique, he feels, is feasible for power turbine stages and perhaps a cast turbine wheel in one piece and cast in one operation can one day be produced.

Possibilities — The compressor, made of aluminum alloys for the pressure ratios and resulting discharge temperatures, will most likely be of two-piece construction, Dr. Frey reports. The inducer portion will be a permanent mold casting and the expeller a forging, adequate for the stresses encountered. The possibility of producing a cast expeller either as a separate piece or integral with the exducer in the radial inflow turbine may be developed eventually.

In short, the rotating parts of the auto turbine trend heavily toward precision casting. Even the bearing casing, which in the Ford turbine is a nodular iron casting with quite thin wall sections, dictates development of accurate molding methods as a major factor in the coming of the turbine.

Materials—The materials to be cast, in the opinion of Dr. Frey, will be iron base (with no cobalt) and austenitic alloys (with a minimum of scarce nickel). Austenitic alloys appear necessary in such parts as compressor turbine blading or radial inflow expellers. Low-alloy, cast-ferritic materials are satisfactory for power turbine stages, either in the blades or in an all-cast structure.

The other components of the turbine loom relatively straightforward. Shafts, gears, housings, etc., promise to follow conventional practice. In fact, wit the exception of the added preci sion foundry operations and re duction in lengthy machinin lines, the engine plant of tomor row promises to look recognizabl like its counterpart of today.

Timing—The engine plants re cently built and to be built in th next year or two won't substantial ly influence when the automaker will go turbine, incidentally. Cit ing the fact that many engin plants only two or three years ol are already obsolete, one spokes man figures the turbine will ar rive on the scene as soon as it i ready, regardless of this facilitie factor.

The gas turbine will be read when it does everything the aut engine of today does. Engineer are moving close to that goa Now the key role in introductio of the turbine is shifting to th production people who at last wi hold in their hands a bundle c blueprints for parts which ca be made.

Big Strides—That is not to sa that any phase of turbine researc is a closed issue, or that any an swer can be considered final. Bu it does represent a shift in em phasis during the past year.

It indicates, further, that in troduction of the turbine loom ever larger as a matter of com petitive pressure rather than tech nological refinement. Automak ers will continue to improve the designs, but the day when th boss says "build it" cannot be fa off. One source figures that with in the next two years an aut company will offer limited produc tion of a turbine-powered car, eve at a heavy cost penalty, just fo the prestige value of being firs

Line-up — Meanwhile, Detro rests in the lull before the stor in turbine talk. General Moto is reportedly readying a turbin powered sports sedan for the 195 Motorama, and both Chrysler an Ford are rumored to be workin on turbine vehicles of considerab promotional noise.

A major factor in these pro jects could be the upcoming spee runs for U. S. turbine powere cars during Nascar's Speed Wee next February at Daytona Beac Fla.

U. S. Auto Output

Passenger Only

	1955	1954
January	659,719	456,765
February	675,769	443,257
March	794,188	526,076
April	754,007	533,470
May	724,891	494,250
June	649,372	504,811
July	659,979	441,451
August	614,392	436,650
September	461,592	285,860
October	517,696†	236,635
November		508,466
December		641,971
Total		5,518,662

Week Ended	1955	1954
Oct. 29	158,430	68,649
Nov. 5	162,278	92,766
Nov. 12	180,754	116,285
Nov. 19	179,250	133,969
Nov. 26	151,242†	111,910
Dec. 3	165,500*	144,995

†Preliminary *Estimated by STEEL
Source: *Ward's Automotive Reports*

WHY ZINC RATES FIRST IN DIE CASTING • NUMBER 5 OF A SERIES

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The ZINC die castings are shown as they are received by Schick from the die caster. Not only are all assembly elements accurately cast, but the design details (note the raised trade mark and the recessed lettering on the nameplate) are sharply defined. *No machining is required* and, since the castings are ZINC, standard plating procedures are used. The right and left hand "whisk-its" (which snap open for easy cleaning) and the shearing head divider are bright chrome. The nameplate is finished in a soft silvery satin with the recessed lettering painted black to provide quick product identification.

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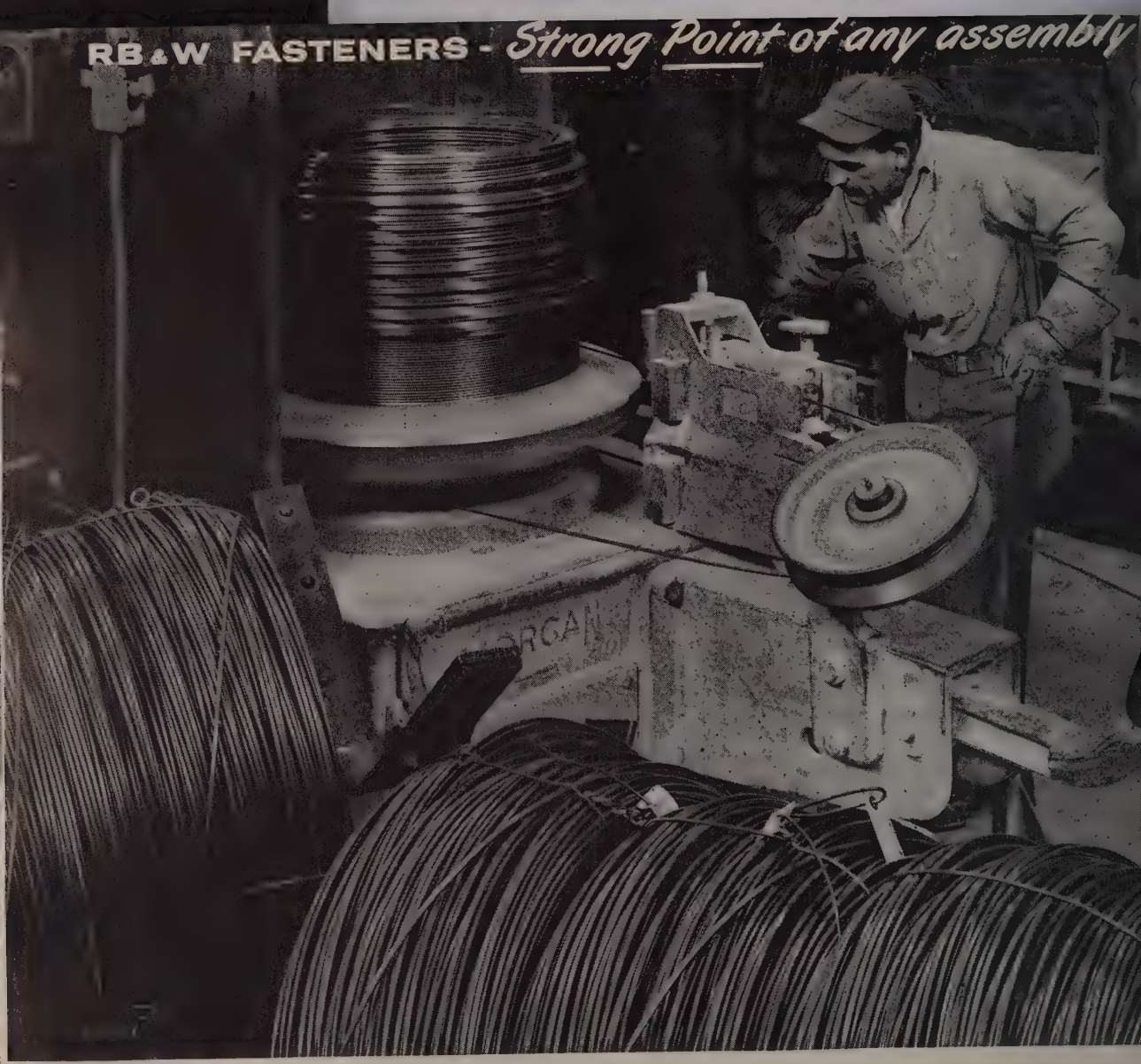

Putting the squeeze on wire for a better bolt or nut

HERE's wire rod squeezing through a succession of drawing dies at RB&W. Why draw wire when it can be purchased in standard dimensions? Because it's a form of quality control that helps make better fasteners.

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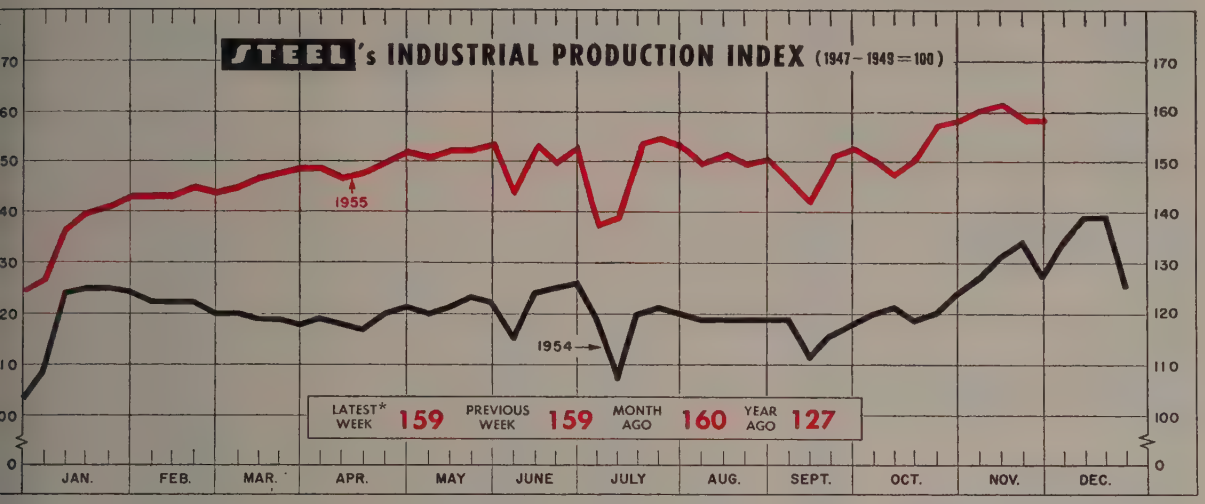

eek ended Nov. 26. Based upon and weighted as follows: Steel Output, 35%; Electric Power Output, 32%; Freight Car Loadings, 22%; and Auto Assemblies, 11%

Commodity Prices Are Key to Uptrend

RICES WILL BE going up in 56.

The tipoff comes from commod- prices which have been tacking ward quietly since early this ar. Higher prices paid for raw aterials in the forepart of 1955 ll be transmitted into consumer kes through first half of '56.

On the Way—The middleman has en paying more already. Com- erce department reports show e wholesale price index for met- s and metal products has been mbing steadily since middle 1954, en before the slump ended.

In March, 1954, that index stood 126.3. By Christmastime, it d touched 129.8 and in Septem- r this year had jumped to 141.8. can't help but go higher.

Here's Why — Metals lead the ay in a price spiral. First jumps ve been spotted in scrap. Com- site prices for steelmaking scrap e running about $46.33, a steady se since January ($34.95) and e highest rate since January, 51. They may hit $60 by mid- 56, according to Eliot Janeway, nsulting economist.

Construction materials cost 8 r cent more than they did last ar—sure sign that building will more expensive in 1956. Jones Laughlin Steel Corp.'s hike on tras for its junior beams and annels (a building "big") points the way. Other steel prices are bound to follow.

Defense Costs Swell — Defense Secretary Charles E. Wilson reports that inflation will boost the cost of defense spending for fiscal 1957, while the volume of defense needs will be about the same; materials and labor will cost more (See STEEL, Nov. 28, p. 60).

Labor will be asking for more money next year, too. Many of next year's price hikes will just be partial compensation for past wage increases, but some of them will be anticipating new labor demands.

Trend Lines—Right now the Labor department's consumer price index is holding steady. Whole-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,394[1]	2,416	1,941
Electric Power Distributed (million kw-hr)	10,750[1]	11,149	9,317
Bitum. Coal Output (1000 tons)	10,210	9,810	9,070
Petroleum Production (daily avg—1000 bbl)	6,860[1]	6,851	6,265
Construction Volume (*ENR*—millions)	$305.5	$401.7	$254.2
Auto, Truck Output, U. S., Canada (*Ward's*)	181,116[1]	213,468	139,858
TRADE			
Freight Car Loadings (1000 cars)	720[1]	772	697
Business Failures (Dun & Bradstreet, no.)	206[1]	214	208
Currency in Circulation (millions)[3]	$30,824	$30,794	$30,412
Dept. Store Sales (changes from year ago)[3]	+6%	+9%	+2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$23,153	$20,145	$20,821
Federal Gross Debt (billions)	$279,814	$279,714	$278,780
Bond Volume, NYSE (millions)	$17,152	$17,742	$23,534
Stocks Sales, NYSE (thousands of shares)	8,977	12,430	13,688
Loans and Investments (billions)[4]	$85,781	$85,259	$85,894
U. S. Govt. Obligations Held (billions)[4]	$30,377	$30,300	$37,411
PRICES			
STEEL's Finished Steel Price Index[5]	208.90	208.90	194.53
STEEL's Nonferrous Metal Price Index[6]	265.2	265.1	217.8
All Commodities[7]	111.1	111.2	109.5
Commodities Other than Farm & Foods[7]	119.1	119.1	114.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278; 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

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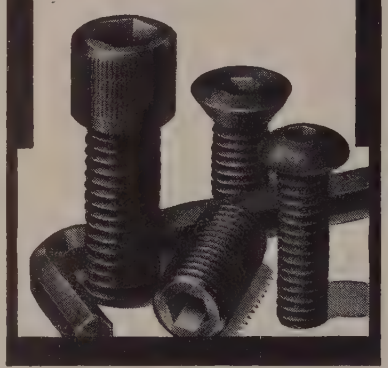

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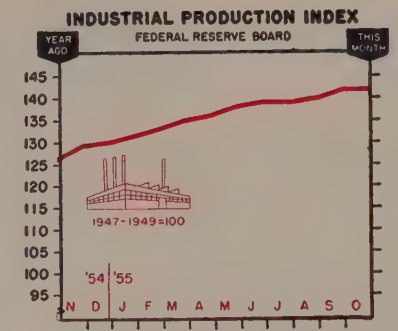
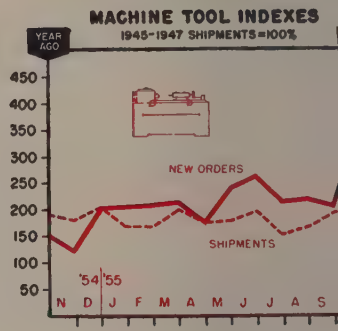
THE BUSINESS TREND





(seasonally adjusted)

	Total Production 1955	Total Production 1954	Primary Metals 1955	Primary Metals 1954	Metal Fabricating 1955	Metal Fabricating 1954
Jan.	131	125	127	111	156	155
Feb.	133	124	131	108	157	152
Mar.	135	123	135	103	158	148
Apr.	136	123	138	104	160	146
May	138	124	140	106	162	147
June	139	124	143	108	163	145
July	139	124	134	104	167	148
Aug.	140	123	139	105	170	148
Sept.	142	124	145	117	171	148
Oct.	142*	126	146*	110	173*	149
Nov.	...	129	...	118	...	155
Dec.	...	130	...	120	...	156
Avg	...	125	...	110	...	150

Federal Reserve Board. *Preliminary

Charts copyrighted, 1955, STEEL

	New Orders 1955	New Orders 1954	Shipments 1955	Shipments 1954
Jan.	203.0	173.5	167.3	31
Feb.	209.4	159.8	168.2	32
Mar.	214.6	169.6	202.5	32
Apr.	178.1	142.8	180.1	30
May	243.7	139.5	180.9	27
June	263.2	185.2	198.8	27
July	217.8	124.7	152.9	20
Aug.	221.3	147.9	164.6	20
Sept.	207.3	180.9	195.4	21
Oct.	349.7*	148.9	204.8*	19
Nov.	....	119.5	....	17
Dec.	....	202.9	....	20

*Preliminary

National Machine Tool Builders' Ass

sale prices are increasing only slightly overall, although much of the pressure holding them in line comes from drops in farm commodities, not metals.

Business is good. Consumers are making more and spending more with liberal retail credit rates. They can't object too much to a price hike, especially with a personal income tax cut in sight.

Remains to be seen: Just how big a part government credit restrictions will play in keeping the price spiral from stretching out of shape.

Machine Tool Orders Rise . . .

Another sign that businessmen are still confident about 1956 is the amount of money they plan to put into production capacity.

"Business spending for plant and equipment is scheduled to jump sharply to a new peak in 1956," says Dr. Leo Barnes, chief economist, Prentice-Hall Inc., New York.

The plant and equipment outlay is expected to hit $34 billion this year. Next year it should move up to $38.5 billion.

Backing up Dr. Barnes' claim are record October orders for machine tools, as reported by the National Machine Tool Builders' Association, Cleveland.

October orders totaled $10 million, compared with $61.3 million in September. The indust continued to ship at the rate $60.6 million per month. Most ders came from the Midwest a East.

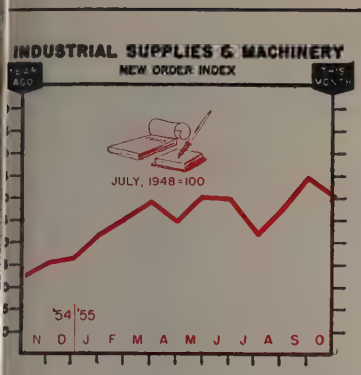
Association president, Lo Polk, head of Sheffield Corp., Da ton, O., says: "The above figu are a natural reflection of the M chine Tool Show. It is too ea to judge whether the October surge indicates a long-term tren

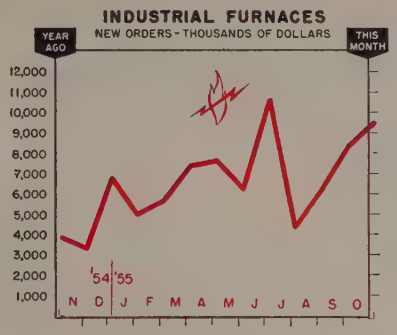
Although some orders may for replacement machines, it loo like a lot of companies are tooli up for more business in 1956.

About Autos . . .

Automobile production is pected to drop somewhat next ye (to 7 million plus), but most ma ufacturers still look for hi profits and sales.

Ford Division of Ford Mot Co. should sell about 1.9 milli cars in 1956, says L. W. Sme general sales manager. This yea sales will be about 1.7 million. problem is lack of capacity, three new assembly plants shou help boost output.





	1955	1954	1953
Jan.	164.4	139.8	157.4
Feb.	175.1	140.5	172.9
Mar.	186.9	141.5	188.2
Apr.	173.7	131.9	132.1
May	191.6	129.4	171.1
June	189.1	136.4	160.0
July	163.7	119.4	155.3
Aug.	181.2	132.5	139.6
Sept.	203.2	148.1	150.6
Oct.	190.0	136.3	146.0
Nov.	....	146.2	144.8
Dec.	....	148.8	136.7

Amer. Supply & Machinery Mfrs.' Assn.

	1955	1954	1953
Jan.	4,973	3,086	5,398
Feb.	5,616	3,086	6,009
Mar.	7,345	4,079	5,101
Apr.	7,639	3,496	5,140
May	6,205	5,848	4,698
June	10,616	5,663	4,910
July	4,338	1,664	6,334
Aug.	6,273	2,570	7,519
Sept.	8,351	2,534	4,442
Oct.	9,568*	3,837	3,486
Nov.	....	3,188	3,430
Dec.	....	6,847	3,081

*Preliminary
Industrial Heating Equipment Assn. Inc.

Ford's price cut ($12.12) on Mainline models probably won't carry over to the rest of the trade. Mainliners now sell close to the asking price for similar Chevrolet models.

It's more likely that automakers will jump prices a bit to meet other increases. Studebaker sets that style with 3 to 6 per cent boosts on its '56 models. Look for other companies to follow suit.

Station wagons are "comers." They're getting a big play from the growing suburban crowd. A low increase next year will build up to sizable amounts by 1957.

Aviation Holds Steady . . .

North American Aviation Inc., Los Angeles, expects sales in the coming fiscal year will be close to this year's $816.7 million.

Most North American sales are for defense needs (99 per cent). Military officials indicate the long look is for less buildup; more maintenance and replacement. Outlook: A gradual decline in aircraft spending—but not next year.

Continental Motors Corp., Detroit, points out that developments in its gas turbine and turbojet engines will mean more military business next year. Light aircraft also looks good for 1956, says the company.

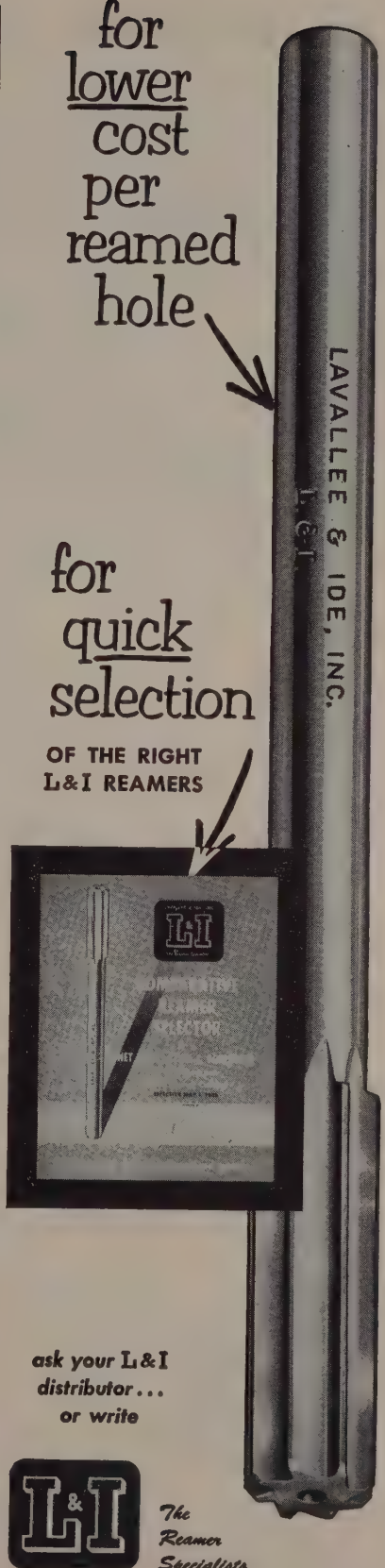
Civilian aircraft shipments numbered 341 in September; 241 in August. Last year, September shipments were 265, according to Commerce department statistics. More orders for civilian airliners will boost monthly totals by next spring.

Coal Comes Back . . .

Coal production has staged a strong comeback this year. Output through Sept. 3 reached about 302 million tons, 20 per cent up from similar 1954 levels. It should close out near the 1953 record of 457 million tons.

High steel production will keep up the demand for coal. Electric utilities, which account for 31.7 per cent of bituminous consumption, are growing rapidly. Coal prices will have to go up to meet needs. Look for boosts during the rest of this year and into '56.

In another fuel field, increased demand for oil in 1956 will be only 3.4 per cent higher than this year's usage. Increase for 1955 has been 7.3 per cent over 1954's consumption.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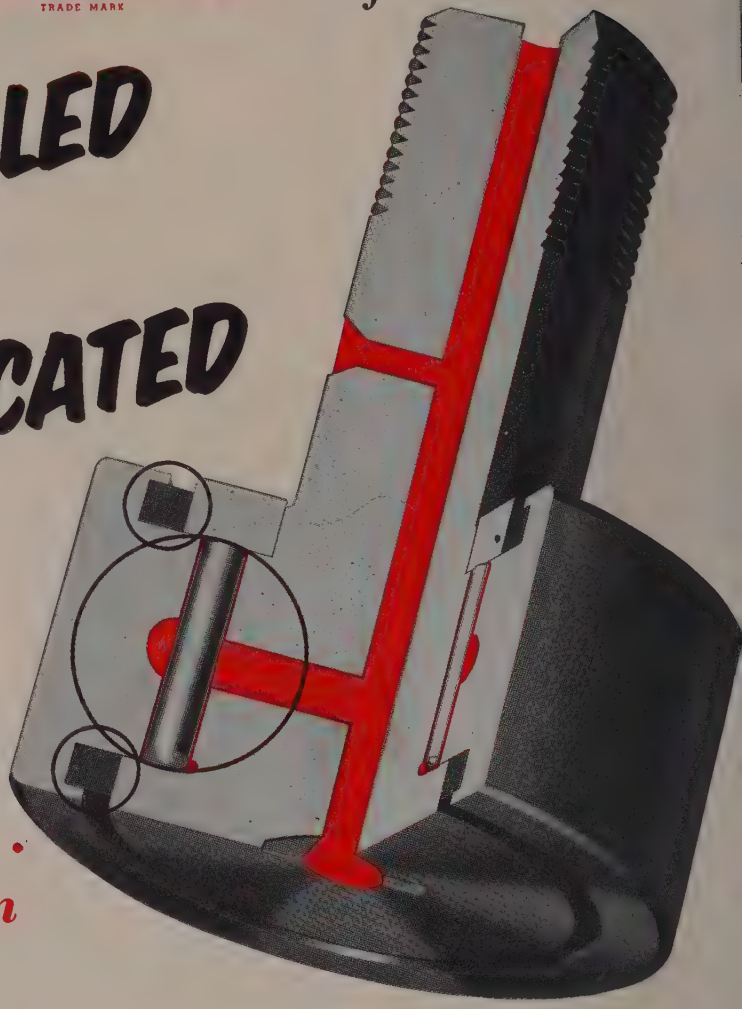

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SCF series

CAMROL® TRADE MARK

bearings

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In one simple assembly, the Sealed CAMROL cam follower bearing give you three big advantages: 1. capacity to withstand the shock and load of ca action, 2. sealing against contamination that would impair the life of an u protected bearing, 3. prelubrication that saves frequent relubrication so ofte undesirable in cam action application. Specially treated seals are built in stud and flange ends, and a black oxide finish offers outside corrosion resis ance. A channeled reservoir in the outer raceway bore helps store reserv lubrication sufficient in many cases for lifetime service. The new SCF seri bearings do not add to the size or weight of standard CAMROL cam followe and are dimensionally interchangeable with them. Ask your McGill repr sentative to show you this newest McGill contribution to the superior pe formance of your cam actioned machinery, or write to our engineering d partment for recommendations. Send for Bulletin SCF-55 for more detaile information.

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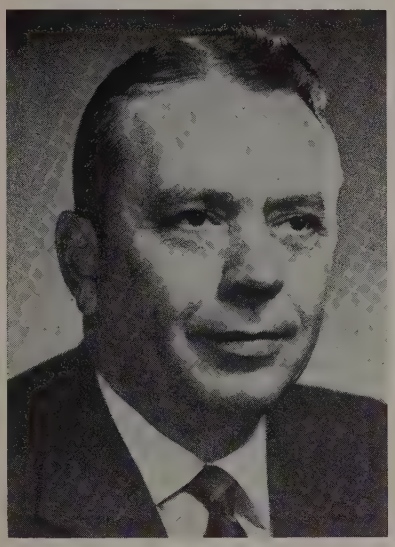
EUGENE P. HAWKINS
. . . Revere Copper v. p.-Michigan Div.



G. O. BRITTON
. . . American Hoist distributor sales mgr.

WALTER E. FROEHLICH
. . . Associated Spring v. p.

Eugene P. Hawkins was elected vice president of **Revere Copper & Brass Inc.**, New York, and appointed executive head of its Michigan division at Detroit. He succeeds **Harold N. Todt**, retired. Mr. Hawkins was assistant general manager of the Michigan division.

Robert W. Christensen was named vice president-engineering for **Skil Corp.**, Chicago. He succeeds **E. J. Kelley**, now on leave of absence.

O. Frank Mederos was elected vice president and assistant to the president of **Walworth Co.**, New York. In addition, he continues in charge of sales in Canada.

Stephen J. Pentrack was made purchasing agent for the materials manufacturing department, **Westinghouse Electric Corp.**, Pittsburgh.

Hugh K. Hybarger, chief engineer of Toledo Pipe Threading Machine Co., joined **J. M. Little & Associates**, Toledo, O., as head of its engineering department.

Howard C. Jones was made director of manufacturing, **Consolidated Vacuum Division**, Consolidated Electrodynamics Corp., Rochester, N. Y. He also will direct traffic, purchasing, quality control and plant engineering operations.

G. O. Britton was made manager of distributor sales of **American Hoist & Derrick Co.**, St. Paul. He was general sales manager of Schield Bantam Co.

George Kastner, formerly chief engineer of Vickers Inc., joined **MacDermid Inc.**, Waterbury, Conn. He will specialize in promotion and servicing of mechanical equipment and also is in charge of advertising and sales promotion.

Donald W. Hill, vice president of **Crown Cork & Seal Co.** and general manager of its specialty division at St. Louis, was promoted to vice president and general manager, crown and closure division. He will be at Baltimore.

Paul W. Koenemund was appointed chief engineer of **Wheeling Steel Corp.**, Wheeling, W. Va. For the last five years he has been general manager of the Benwood, W. Va., Works.

Ralph L. Mudge Jr. was made production manager of **Burroughs Corp.'s** main plant in Detroit. He was general superintendent of engineering services.

R. R. Malik was elected president of **Sun Electric Corp.**, Chicago. **H. M. Coffman** becomes executive vice president. **Frank E. Draper** becomes vice president of the national sales division.

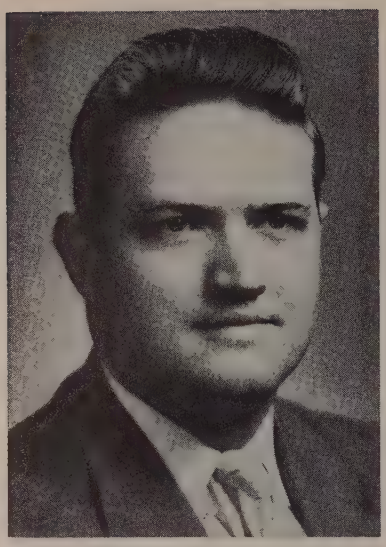
Walter E. Froehlich was elected a vice president of **Associated Spring Corp.**, Bristol, Conn., in charge of sales, research and development. He is succeeded by **G. Theodore Zahnke** as general manager of the three Bristol divisions (Wallace Barnes Co., Dunbar Bros. Co. and F. N. Manross & Sons). **Arthur J. LeVasseur** was made purchasing agent for the divisions and is succeeded as assistant purchasing agent by **John M. Reilly**.

Douglas McIlvaine fills the new post of director of research and development for **Acro Mfg. Co.**, Columbus, O. He was manager-research and development at Soreng Products.

Allied Products Corp., Detroit, elected **Carl C. Kamphausen** executive vice president in charge of metal parts production operations at Plants 1, 3 and 5.

Taft-Peirce Mfg. Co., Woonsocket, R. I., appointed **Russell W. Grabinsky** assistant superintendent, small tool and gage division.

Promotions in the **Doehler-Jarvis Division** of National Lead Co., New York, include: **Fred W. Burgie**, to assistant general sales manager; **Charles I. Hodgson**, to manager of sales of the Toledo, O., plants, succeeding Mr. Burgie; **John W. Thees**, to manager of To-



DR. DAVID C. EKEY
. . . *Lebanon Steel director-research*

HAROLD J. COLEMAN
. . . *Chandeysson Electric sales mgr.*

WILLIAM E. DAILY
. . . *Mechanical Steel Tubing v. p.*

ledo plant No. 1; **Kenneth F. Koegler,** to manager of Toledo plant No. 2; and **Robert H. Mayer,** to manager of the Grand Rapids, Mich., plants.

Dr. David C. Ekey, recently on the staff of Pennsylvania State University and head of its foundry course, joined **Lebanon Steel Foundry,** Lebanon, Pa., as director of research. During the last few years he also served as project engineer at Chambersburg Engineering Co., the Office of Technical Services and J. I. Thompson Co.

Charles B. Hull III was named market analyst for **DeWalt Inc.,** Lancaster, Pa. He was associated with General Aniline & Film Corp., Ozalid Division.

Jones & Laughlin Steel Corp. appointed **Richard G. Carney** district sales manager at St. Louis; **Chester M. Kuhns,** district sales manager at Cleveland; **Alfred C. Pollock,** district sales manager at Columbus, O., and **Robert B. Clark,** assistant district sales manager at Chicago.

Howard K. Beck was elected president of **Jackson & Church Furnace Division,** Saginaw, Mich., Norbute Corp. subsidiary. **F. C. Adams** was made vice president of the division.

Temco Aircraft Corp., Dallas, appointed **Charles C. Convers** and **E. F. Janesic** senior contracts administrators.

Harold J. Coleman was made sales manager of **Chandeysson Electric Co.,** St. Louis. He was a district manager for Essex Wire Corp.

Lee H. Clark, general manager of **Pennsylvania Salt Mfg. Co.'s** Sharples Chemicals Division, was named vice president of the parent company, Philadelphia.

Crucible Steel Co. of America, Pittsburgh, elected **James D. Glenn** vice president-sales and **Maurice J. Day** vice president-research and development. Mr. Glenn was general manager of sales. Dr. Day was director of research and development.

William E. Daily was elected vi president and a director of **M chanical Steel Tubing Corp.,** Ne York. He also assumes similar o fices in two affiliated companie Haydon Products Corp. and Ins lation Materials Corp., both New York. Mr. Daily formerl was a sales manager for Walk Bros., Conshohocken, Pa.

Kensico Tube Co. Inc., Mt. Kisc N. Y., appointed **Elizabeth Wilkie** assistant sales manage Miss Wilkie was formerly wi United Wire & Supply Corp. New York office.

Robert B. Clark was made assis

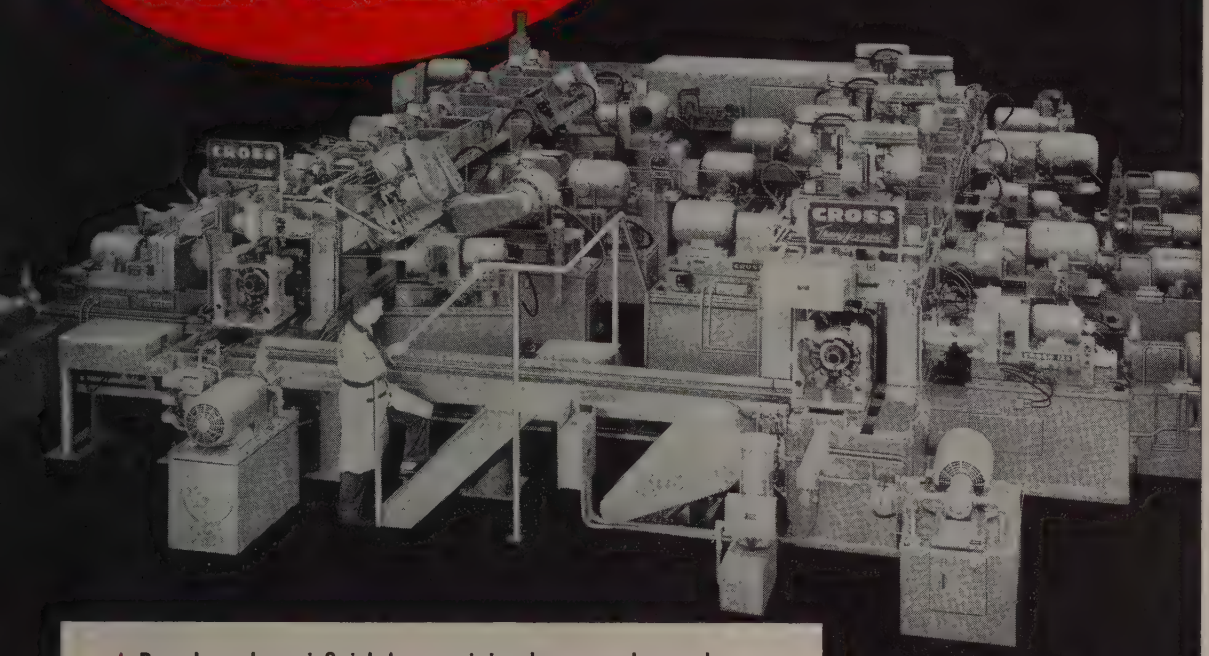
JAMES D. GLENN

MAURICE J. DAY

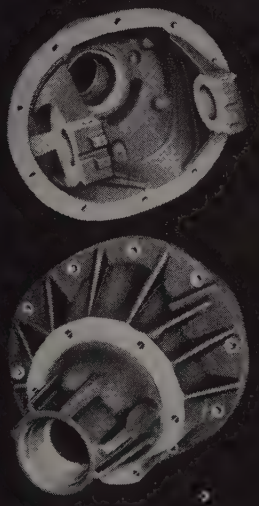
. . . *Crucible elects two vice presidents*

Mills, Drills, Bores, Turns Differential Gear Carriers

Another Transfer-matic by Cross



- ★ Rough and semi-finish bores pinion bores and cross bores; rough and finish faces and turns pilot diameter of torque tube flange; mills faces of cross bore bosses; spotfaces flange mounting holes; drills, chamfers, reams and taps all other holes except flange holes.
- ★ 115 pieces per hour at 100% efficiency.
- ★ 73 operations: 8 milling, 8 boring, 2 crossfacing, 1 turning, 18 drilling, 10 spotfacing, 7 chamfering, 2 reaming, 9 tapping, 8 probing.
- ★ Complete interchangeability of all standard and special parts for easy maintenance.
- ★ Palletized work holding fixtures with hydraulically operated torque wrenches for clamping and unclamping parts.
- ★ Washing and drying unit for cleaning fixtures between last cutting station and loading station.
- ★ Other features: Construction to J.I.C. standards; hardened and ground ways; hydraulic feed and rapid traverse; automatic lubrication system.



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DETROIT 7, MICHIGAN

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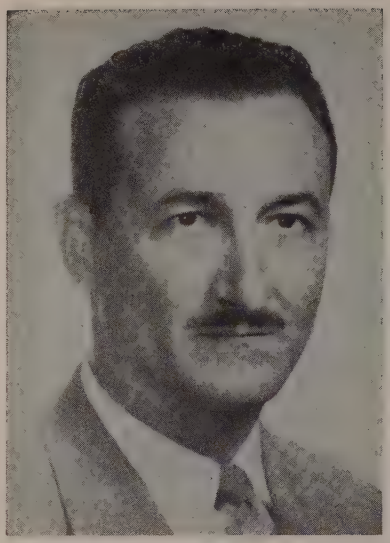
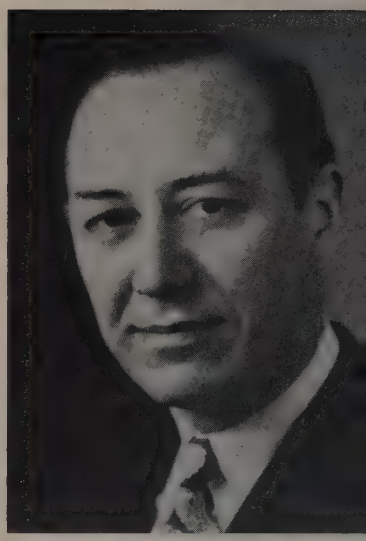


A. L. CANEY
. . . Tuthill Pump sales manager

C. H. WILLS
. . . Michigan Abrasive v. p.



GEORGE R. MILNE
. . . National Carbide president

ant sales manager at Chicago for **Jones & Laughlin Steel Corp.**

A. L. Caney was made general sales manager of **Tuthill Pump Co.**, Chicago. He was district representative in the Midwest for Diamond Chain Co.

Frank A. Grooss was appointed an assistant to Vice President **G. E. Burks**, who has administrative responsibility for the engineering and research departments at **Caterpillar Tractor Co.**, Peoria, Ill. Mr. Grooss was assistant chief engineer at the company's new plant in Decatur, Ill., and is succeeded by **A. W. Sieving.**

B. L. Lerch was made Midwest regional manager of **General Controls Co.**, Glendale, Calif.

C. H. Wills fills a newly created vice presidency at **Michigan Abrasive Co.**, Detroit. He heads a program for development of new products and new applications for present ones. He was vice president-sales. **W. S. Hoskin** becomes general sales manager.

M. R. McLary was elected vice president of **Ingersoll Products Division**, Borg-Warner Corp., Chicago. He has been works manager since December, 1954, and continues in that position.

Edward J. Lunney was made chief engineer in charge of the research and analysis department of **Barry Controls Inc.**, Watertown, Mass. He formerly was with the Wright Air Development Center, U. S. Air Force.

George R. Milne, vice president-o erating, was appointed preside of **National Carbide Co.**, a divisi of Air Reduction Co. Inc., Ne York. He succeeds the late **J. Ca Bode. Russell T. Lund**, vice pres dent, succeeds Mr. Milne as vi president-operating. Mr. Milne headquarters will be at New Yor Mr. Lund remains at Calvert Cit Ky.

Edwin C. Geisher was made chi engineer of **Bush Mfg. Co.**, Har ford, Conn.

P. A. Beckjord was made manag of electric utility sales for the ce tral region of **Westinghouse Ele tric Corp.**, Pittsburgh. He su ceeds **P. T. Lagrone**, now electr utility sales manager for the co pany.

OBITUARIES...

Gordon M. Mather, 87, chairman of the board of **Mather Spring Co.**, Toledo, O., died Nov. 16.

Harold H. Henricks, 66, president, **Youngstown Steel Door Co.**, Cleveland, died Nov. 20.

Gerald G. Lipke, 41, sales manager for standard products, **Hagan Corp.**, Pittsburgh, was killed in an air liner crash in Colorado on Nov. 1.

Nils A. Tornblom, 59, director of design and development engineering for **Revere Electric Mfg. Co.**, Chicago, died Nov. 15.

Frank E. Payne, 72, chairman of **Crane Packing Co.**, Chicago, died Nov. 20. He was a co-founder of the company, and its president from 1917 to 1951.

George Gorton Sr., 90, president of **George Gorton Machine Co.**, Racine, Wis., died Nov. 22.

Charles F. Feledy, 63, development engineer for **Armco Steel Corp.**, Middletown, O., died Nov. 22.

Eustace E. Blundell, 77, president and general manager of **Comme cial Centerless Grinding Co.**, Clev land, died Nov. 18.

Arvid H. Svensson, a founder an former owner of **Buffalo Machin Mfg. Co.**, Buffalo, died Nov. 19.

Seth T. McCormick, 56, a field e gineer with the wire rope divisio of **Bethlehem Steel Co.**, New York died Nov. 20.

R. DeWitt Spradling, 61, presiden and chairman of Armco, Arge tina, and Armco, Uruguay, subsid iaries of **Armco Steel Corp.**, Mid dletown, O., died recently.

Westinghouse Plant

Facility at Blairsville, Pa., bridges gap between research and commercial applications

WESTINGHOUSE Electric Corp.'s metals plant at Blairsville, Pa., is approaching full operation. It was built for metals research, development and production and will function as a clearinghouse for metals information.

The main purpose, says W. M. Trigg, plant manager, "is to bridge the gap between research and the commercial application of metals in the electrical industry." Although emphasis will be on the development of new metals for end use in Westinghouse products, he added, customer orders will be accepted for special metal alloys, metal products and development services.

Breakdown — Westinghouse has invested about $6 million at Blairsville to create an integrated and self-contained unit for complete metallurgical development. The plant is organized into two major departments: Wrought alloys and precision castings.

Facilities include equipment for vacuum melting, forging, hot rolling, cold rolling, conditioning, pickling and heat treating. Equipment for limited manufacture of powder metal parts is provided.

In addition, facilities for investment and shell mold casting have been installed. (An engineering story on the Blairsville facility will appear in the Dec. 12 issue of STEEL.)

Kaiser To Install Presses

Kaiser Aluminum & Chemical Corp., Oakland, Calif., will install four extrusion presses at its plant at Halethorpe, Md. This will raise the plant's annual capacity to 46,200,000 lb of extrusions.

Chromalloy Moves Facilities

Chromalloy Corp. moved its offices from New York to 450 Tarrytown road, White Plains, N. Y., is occupying its plant in that city this month. Chromalloy's new plant contains more than 12,000 sq ft of floor space, almost double that of former facilities. The firm's process increases the heat, wear and corrosion resistance of ferrous metals by high-temperature diffusion of chromium into the surface.

Aurora Metal Co. Expands

Aurora Metal Co., Aurora, Ill., expanded its production facilities to include a complete line of copper-base shell mold castings. Fully automatic equipment will accommodate parts up to 20 x 30 in. (pattern size). This firm also offers complete engineering, metallurgical, pattern making and finish machining facilities.

A. Milne Opens Detroit Branch

A. Milne & Co., New York, opened a tool steel warehouse at 4820 Wabash Ave., Detroit. W. Ted Nagorsen is manager of the new facility.

Establishes Birmingham Branch

All-State Welding Alloys Co. Inc., White Plains, N. Y., established a southern division office at 3 Pamona Drive, Birmingham. Charles Brown is manager of the division.

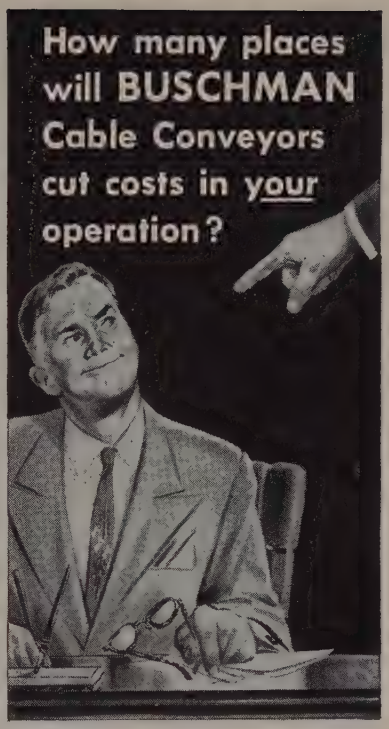
Ryerson Enlarges Facilities

Joseph T. Ryerson & Son Inc., Chicago, is enlarging its Buffalo plant and office space by almost 50,000 sq ft. The added space will be used to stock larger tonnages of stainless steel, including cold-finished carbon and alloy steel bars, welded and seamless carbon steel mechanical tubing and carbon steel sheets. It will also house the firm's sheet steel processing operations, now carried on in leased space.

Offers Stainless Steel Award

Allmetal Screw Products Co. Inc., Garden City, New York, is sponsoring an annual award for the author of the article of most value and interest to those who specify or buy stainless steel parts or components. The award was initiated when Allmetal, manufacturer of stainless fasteners, found

(*Please turn to page* 112)



Throughout your plant . . . Buschman "Universal" Cable Conveyors can save you real dollars in handling light and medium loads.

How? Lower initial and maintenance costs than other overhead types . . . smoother operation . . . shorter radius curves and dips permit more complete utilization of space, require less room inside industrial ovens, washers, dip tanks, etc. . . . faster, easier rearrangement.

Investigate the savings possible in *your* plant! Contact your local Buschman representative or write for catalog.

Below: 9½" radius Quick Dip

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CONVEYOR SYSTEMS FOR ALL INDUSTRIES

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YOUR JOB, LIKE THESE SHOWN ABOVE, WILL BE TEST PROVI

under simulated production conditions to determine c
saving benefits and other advantages. Ransburg also ma
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to prove the painting of YOUR products with

RANSBURG

Electrostatic Painting Processes

Let us make laboratory tests and prove the advantages and cost-saving benefits of painting YOUR products AUTOMATICALLY with one of the Ransburg Electro-Spray Processes.

GET THE FACTS . . . IT COSTS YOU NOTHING!

STEP BY STEP—HERE'S WHAT YOU GET . . .

- Survey of your plant by Ransburg's experienced field engineers, including savings estimate.
- Lab painting demonstration of your products, using equipment closely simulating your own production conditions.
- Accurate measurements of paint film thickness.
- Engineering report of detailed tests to determine paint and labor savings.
- Coated samples of your job, lab production photos, and even movies if desired.
- Detailed drawings of equipment and workholder.

All of the above without obligation to you. And, before equipment is installed you receive detailed, pre-installation instructions. Too, a well-qualified, experienced engineer supervises installation and trains your operator on the job. Ransburg offers continuing laboratory and field service to help you with any of your finishing operations.

Ransburg

ELECTRO-COATING CORP.

Indianapolis 7, Indiana

● **First,** Ransburg sales engineers will make a survey in your plant to check the possibilities of using Electrostatic Spray Painting on your products. Next, you will send samples of your unpainted products—with paint—to the Ransburg laboratories in Indianapolis.

Here, the technical staff takes over. The Ransburg Engineering staff—which includes PH.D's and Masters in Physics, Science, Electrical, Mechanical and Chemical Engineering—makes a complete study of your job. Not only do they have the necessary academic training, but they have the "know how" gained from years of actual experience in the field. Ransburg, you know, was the pioneer in Electrostatic Spray Painting 15 years ago. Engineers and well-qualified technicians have at their disposal every facility for conducting complete tests, simulating your own production conditions. They'll decide which type conveyor is best suited for your job. (There's a conveyorized lab set-up—22 in all—to handle products ranging in size from automobile bodies and chassis to small components, such as window hardware.) They'll design workholders, if necessary, and determine exactly how your job can be run to your best advantage. Details, such as fixture spacing, will be worked out too.

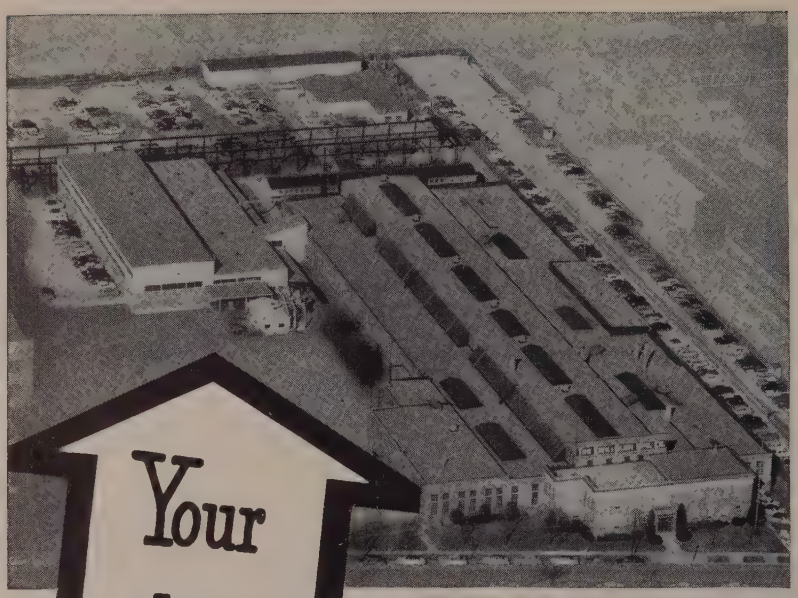
After preliminary studies and tests, you are invited to Indianapolis to see your job run in the lab. If you wish, photos and even movies of your test run can be made and furnished for your own production people to study. You see first-hand what Ransburg Electrostatic Spray Painting can do for you in your own plant.

YOU GET PAINT AND LABOR SAVINGS

Paint usage is accurately measured during the demonstration. The Ransburg No. 2 Process will provide savings up to five times the paint mileage of hand spray. And, one unit can do the work of many hand sprayers. You will see the improved, uniform quality of the work . . . you'll know what kind of increased production to expect, and you can recognize labor savings. ALL OF THIS WITHOUT OBLIGATION.

Ransburg service doesn't end there. After the equipment is installed in your plant—with our supervisory help—we will train your operator and continue to work with your finishing department. Our technically-trained field service engineers are always available to assist with any of your finishing problems.

Briefly, that's our story. Now it's your move. Call or write Dept. S.



Your plant is in this picture

- Weldments
- Components
- Assemblies
- Sub-Assemblies
- Cabinets
- Housings
- Enclosures

IT might as well be YOUR plant, for in it, Kirk & Blum can bring your drawings to life . . . with substantial savings for you in costs and capital investments.

Kirk & Blum offers complete facilities for the fabrication of sheet and plate to ½" thickness—and light structurals. We specialize in aluminum, monel, stainless and other alloy fabrication.

In the modern 150,000 sq. ft. Kirk & Blum plant is to be found the latest metalworking equipment available, operated by skilled sheet metal craftsmen. Overhead cranes, to 25 ton capacity, serve entire assembly areas and interior rail siding. A new warehouse contains extensive inventories of materials. Coordinated for speed, versatility and accuracy, these facilities assure successful and economical completion of your products.

THE KIRK & BLUM MANUFACTURING CO.

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Established 1907

KIRK & BLUM
SHEET METAL FABRICATION

(*Concluded from page* 109)

that although annual U. S. sta less volume had doubled sin 1945, communication about its a plication is at the prewar level.

Aluminum Fabricators Unite

Kawneer Co., Niles, Mich., pr ducer of aluminum products f building, aircraft and appliance dustries, purchased Weatherst Windows Ltd., Toronto, Ont., fa ricator of aluminum windows a curtain walls.

U. S. Graphite To Expand

Wickes Corp.'s United Stat Graphite Division, Saginaw, Mic plans a $600,000 expansion pr gram. The project includes $500,000 addition to the plan carbon - finishing department, $100,000 addition to the offi building and a new loading doc

Walworth Buys Pipe Fabricato

Walworth Co., Greensburg, P maker of valves and pipe fittin purchased Southwest Fabricati & Welding Co. Inc., Houston, o of the leading pipe fabricati companies in the U. S.

Rockwell Builds on West Coast

Rockwell Mfg. Co., Pittsburg will build a 100,000-sq-ft wa house, assembly and repair pla at Porterville, Calif. The pla will be completed by early 1956 an estimated cost of $1 million.

Tay-Holbrook Inc. To Move

Tay-Holbrook Inc., supplier plumbing and heating equipme with branches throughout Ca fornia, has leased a $1-milli sales office, warehouse and distri uting center in San Leandro, Cal Operations will start in April.

Rodney Metals Opens Branch

Rodney Metals Inc., New Be ford, Mass., opened a branch o fice and warehouse at 4312 Paci Way, Los Angeles 23, Calif. It under the supervision of Willia Brown. The company specializ in precision rolled, wide, thin stai less steel strip. Other produc

tomotive Steering Knuckle Support
ged from 1-15/16" Hot Rolled Round
AISI Grade 1340

FORGEABILITY

MACHINABILITY

HEAT TREATING PROPERTIES

BALANCED TO CUT YOUR COSTS

J&L STEEL

Forging Quality Steel Bars

Balance—the correct proportion of forgeability, machinability, and heat treating properties in forging steels—directly affects your profits. Balance of these properties reduces operating costs, and also produces higher-quality, finished forgings.

Careful metallurgical control of every process from ore mine to finishing mill at J&L assures the production of forging steels with the correct balance of properties you require.

Whether you produce rugged, heavy-duty forgings or lightweight, high-strength parts, J&L forging steels give the best results. Our staff of experienced metallurgists is available to help you establish the specifications to fit your need. Write or phone our nearest district office.

Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

&L FORGING STEELS EXACTLY TO SPECIFICATION

Due to the unusual deep socket in the above Adjusting Screw it could not be formed from regular annealed and processed cold heading wire.

Keystone's metallurgist recommended Keystone "Special Processed" wire. The manufacturer has now standardized on "Special Processed" wire for this and other difficult cold headed parts. His results have been improved quality, increased production and lower cost per unit.

The superior grain flow characteristics of Keystone "Special Processed" wire provide the necessary upsetting and die forming qualities to withstand the terrific metal displacement in your most difficult cold heading jobs. Your inquiry is welcomed.

Keystone Steel & Wire Company
Peoria 7, Illinois
Industrial Wire Specialists

are specially treated prepainte steel strip that can be blanke formed and deep drawn; precisio rolled shim steel; and aluminu strip.

Hamilton Mfg. Buys Tool Line

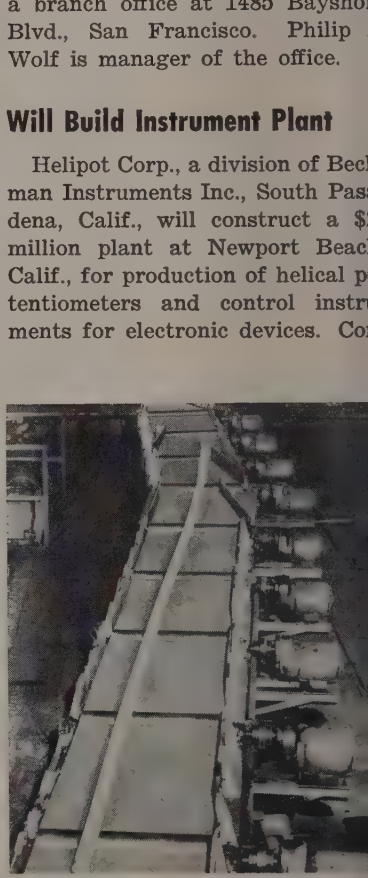
Hamilton Mfg. Co., New Have Conn., purchased Barnaby Too Division of Barnaby Mfg. Co. In Bridgeport, Conn., maker of scre machine and turret lathe tool Stanley Roczynski has been a pointed to head all manufacturi at Hamilton Mfg.

Instrument Firm Opens Branch

Research & Control Instrumen Division, North American Philip Co. Inc., Mt. Vernon, N. Y., opene a branch office at 1485 Baysho Blvd., San Francisco. Philip Wolf is manager of the office.

Will Build Instrument Plant

Helipot Corp., a division of Bec man Instruments Inc., South Pas dena, Calif., will construct a $ million plant at Newport Beac Calif., for production of helical p tentiometers and control instr ments for electronic devices. Co



More Horseshoe Steel

Powered-roller tables, built and i stalled by E. W. Bliss Co., Salem, C are among the new equipment Phoenix Mfg. Co.'s $4-million mercha bar mill at Joliet, Ill. With a month capacity of 12,000 tons, the mill geared for high-speed output a achieves top mechanization with mi mum investment per ton of capac

ruction is expected to be com-eted by September, 1956.

acobson Nut Is Building

Jacobson Nut Mfg. Corp. is uilding a plant on Mark road, enilworth, N. J. The firm makes complete line of nuts.

ASSOCIATIONS

J. L. Robinson, vice president of abez Burns & Sons Inc., New ork food processing equipment nd machinery company, was elect-l president of the **National Metal rades Association,** Chicago. He ucceeds E. S. Day, vice president nd general manager of Collyer nsulated Wire Co., Pawtucket, . I. Other association officers are . F. Newhouse, Saranac Machine o., Benton Harbor, Mich., first ce president; H. M. Ramel, Moog ndustries Inc., St. Louis, second ce president and treasurer.

Grant S. Diamond, president, lectro Refractories & Abrasives orp., Buffalo, was elected presi-ent of the **Grinding Wheel Insti-ute,** Cleveland. He succeeds C. E. theridge, Macklin Co., Jackson, ich.

Earl H. Houck, supervisor of afety and welfare at the Ali-uippa Works, Jones & Laughlin teel Corp., was elected general hairman of the **Metals Section, ational Safety Council,** Chicago.

Service Tools Institute, New ork, elected Hoyt C. Pease and . J. Muldoon president and vice resident, respectively. Mr. Pease is ice president and general man-ger of the Stanley Tools Division, tanley Works, New Britain, Conn. Ir. Muldoon is sales manager, and Tool Division, New Britain Iachine Co., New Britain, Conn.

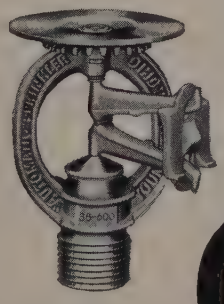
Eastern Michigan chapter of **ociety of Die Casting Engineers** nc., Detroit, elected the following fficers for 1956: Chairman, John apin, Saginaw Bay Industries, ay City, Mich.; vice chairman, Iarshall Aberle, H & M Industries nc., Flat Rock, Mich.; secretary-

(*Please turn to page* 118)

If you, like most businessmen, are seeking a steady PROFIT builder for your business, you'll find that ENGINEERED "Automatic" Sprinkler FIRE PROTECTION is the answer.

It's an investment that returns substantial dividends whether you ever have a fire or not.

Let us show you how!

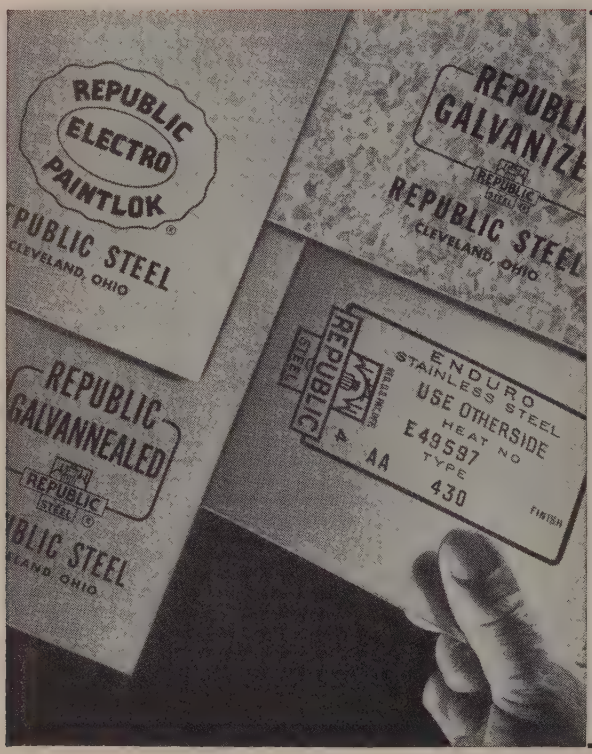


What's worth insuring is worth protecting!

"Automatic" Sprinkler
CORPORATION OF AMERICA
YOUNGSTOWN, OHIO

Offices in Principal Cities of North and South America

These 4 Big Advantages when you fabricate with



REPUBLIC MAKES A VARIETY OF SHEETS

Whatever the requirement, fabricators find Republic Steel Sheets ideal for a wide variety of applications.

Republic Galvanized—with a steel or copper steel base—is highly ductile, easily bent, flanged, or otherwise fabricated. Its tight zinc coating assures years of trouble-free service.

Republic Galvannealed—with a steel or copper steel base—will take paint and lacquer without preliminary treatment. The spelter coating adheres tightly to the base metal, will not flake or peel. It's ideal where product is exposed to severe weather.

Republic Enduro® Stainless Steel—offers more advantages than any other commercial metal. It resists rust and corrosion—is attractive and easy to clean. It's tough, strong, and resists heat. And it can be fabricated on your present equipment. We will be glad to furnish additional facts promptly.

REPUBLIC STEEL

REPUBLIC STEEL CORPORATION
3120 East 45th Street
Cleveland 27, Ohio

Please send additional information on:

- ☐ Republic Electro Paintlok Sheets
- ☐ Republic Galvannealed Sheets
- ☐ Republic Galvanized Sheets
- ☐ Republic Enduro Stainless Steel Sheets

Name_____ Title_____

Company_____

Address_____

City_____ Zone___ State_____

K-9654

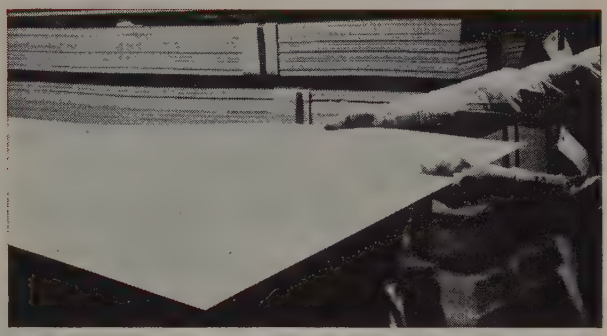
REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

...will save you money
...Republic Electro Paintlok

NO STORAGE RUST

Thanks to a combination of electro-galvanizing and a special paint-bonding chemical treatment, Republic Electro Paintlok sheets may be stored for long periods of time under approved warehousing conditions without damage due to rusting. An adequate inventory can be maintained to avoid costly shutdowns during peak periods. And you save in reclamation work or actual loss from unusable sheets.



MINIMUM CLEANING COSTS

Degreasing Republic Electro Paintlok sheets is unnecessary when no drawing compound is used. They come in prime condition for painting. Only the removal of fingermarks, fabricating oils and any dirt acquired during warehousing and fabrication is necessary. Surfaces are pre-conditioned. No pre-etching is required. And because they are cleaner to handle, employees like to work with them.

LOWER PRODUCTION COSTS

The ability of Republic Electro Paintlok's zinc coating to remain absolutely tight during drawing, bending, rolling, shearing and punching operations—with no fracturing, no cracking, no peeling or flaking—speeds production and lowers costs. Uniformity of gage—plus increased die life due to the lubricating quality of the coating—make further economies possible. Ask any of our customers about these important advantages.

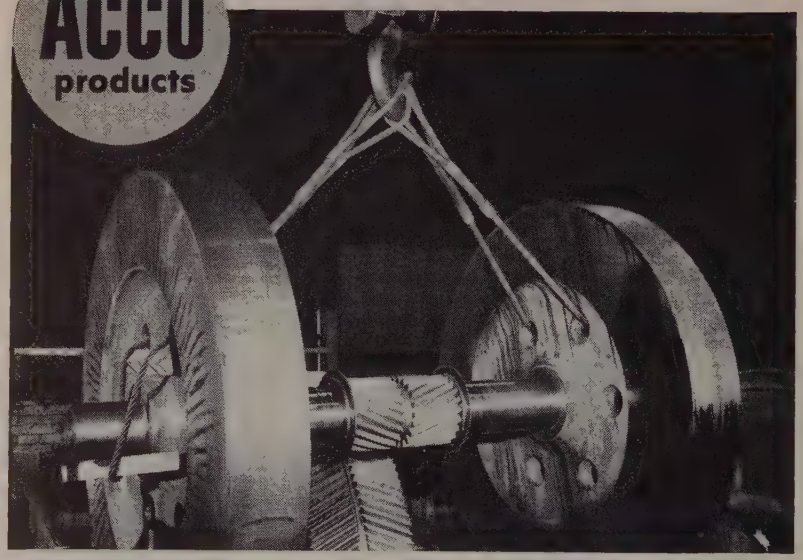
MAXIMUM PAINT ADHERENCE

Republic Electro Paintlok is zinc-plated and chemically treated to take paints, lacquers, synthetic enamels—and hold them for years through hard service and severe exposure. The inert, finely crystalline, non-metallic phosphate coating is highly absorbent in character, grips the paint with thousands of tiny "teeth" that never let go.

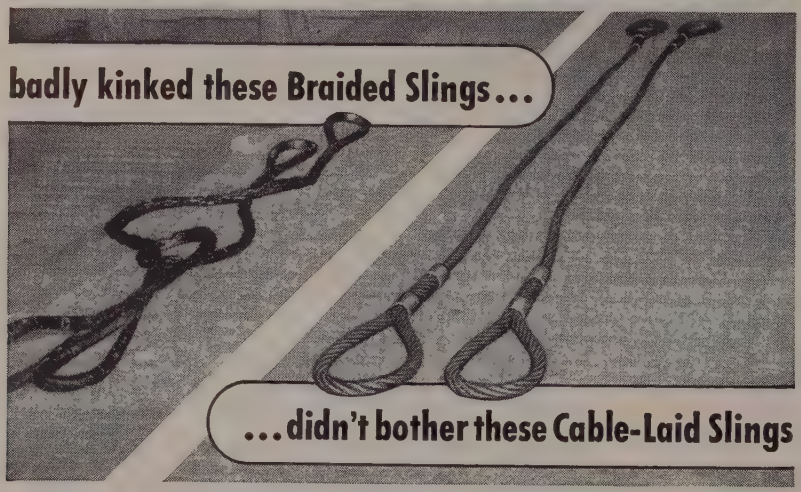
To save money and produce painted or enameled steel products that look better longer—it will pay you to get the complete facts on Republic Electro Paintlok.

This 34-Ton Load...

ACCO products



badly kinked these Braided Slings...



...didn't bother these Cable-Laid Slings

Here's Why:

Because these ACCO *Registered* CABLE-LAID slings combine the flexibility of manila rope with the strength of steel.

The secret of the CABLE-LAID sling is in the construction of the rope. It's a combination of six wire ropes laid around a special steel center to give you a rugged steel body which has:

- **Freedom from Crankiness**
- **Extreme Flexibility**
- **Resistance to Kinking**

With their patented DUALOC endings these CABLE-LAID slings are tops in ease of handling . . . resist abuse . . . and give you longer sling life which reduces lifting costs. And these slings are ACCO *Registered*—with all the advantages that make this specification the standard of efficiency and safety.

See your ACCO Registered distributor or write our Wilkes-Barre, Pa., office today

ACCO

TRADE MARK

Wire Rope Sling Department
AMERICAN CHAIN & CABLE

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn. • In Canada: Dominion Chain Co., Ltd., Niagara Falls, Ont.

for Better Value

(*Concluded from page* 115)

treasurer, Louis Draves, Ternste Division, General Motors Cor Flint, Mich.; librarian-historia F. S. Marr, Detroit Mold Enginee ing Co., Detroit; trustee, Harry Hirsch, C. M. Hall Lap Co., D troit.

REPRESENTATIVES

Industrial Lift Truck Co., Ph adelphia, has been appointed sell and service the line of for lift trucks, powered hand truc and straddle carriers manufactur by **Industrial Truck Division, Cla Equipment Co.**, Buchanan, Mich.

Berry Bearing Co., authoriz stock-carrying distributor for bearing and bearing specialti manufacturers, opened a new sto at 6923-25 W. Archer Ave., Ch cago 38, Ill.

Lamson Mobilift Corp., Portlan Oreg., appointed the followi dealers for its line of fork l trucks: Modern Handling Co. In Indianapolis; Dechert Machi Shop Inc., Palmyra, Pa.; Reag Equipment Co., New Orleans a Natchez, Miss.; Bigelow Robins Co., Little Rock, Ark.; Stan Handling Equipment Co., Ag wam, Mass.; and F. H. Ross & C Charlotte, N. C.

Service Steel Division, Van P Corp., Detroit, appointed R. T. Mi as its sales agent in the Clevela area.

Greer Hydraulics Inc., Jamai N. Y., appointed Hydro-Air In St. Louis, as distributor of its h dropneumatic accumulators a other hydraulic products.

Kaiser Aluminum & Chemic Sales Inc., Oakland, Calif., a pointed Hawkridge Bros. Co., Bo ton and Waterbury, Conn., and E. Zurbach Steel Co., Somervill Mass., as distributors of its alum num products.

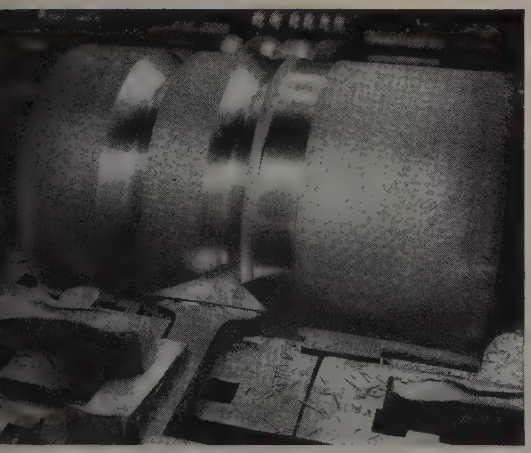
Moriarty & Zahner, Los Angele industrial consultants, were a pointed to represent **Transue Williams Steel Forging Corp.**, A liance, O., in the West.

TIPS FROM A ROLL MAKER'S NOTEBOOK

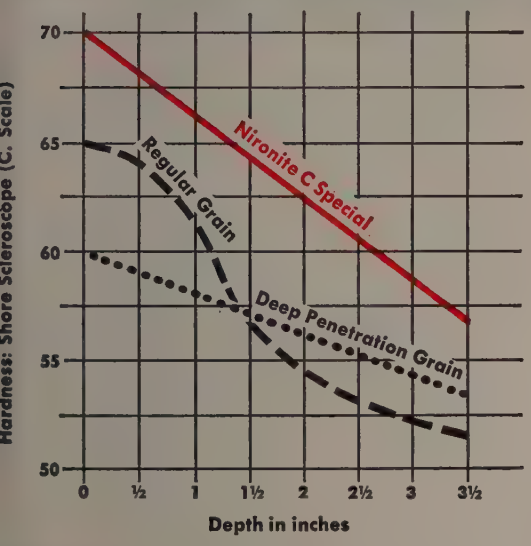
ACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

t mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

low to pick rolls for bar and billet mills



The crux of the problem—Roughing a pass in a roll for a bar mill.



Generalized curves show how hardness decreases below the surface of three types of roll.

Like all rolls, those for the intermediate and finishing stands of bar and billet mills must possess the best possible balance of strength-vs.-hardness. However, they cannot be chosen on this basis alone.

The problem is complicated by the shape and depth of the passes. Many rolls must be cast plain because of the size of the passes or because of the roll user's need for plain rolls which may be turned for any section. Hence, large amounts of metal must be removed during turning.

As a result the metallurgist strives for two prime objectives in rolls for these applications. They are (1) the greatest possible depth of hardness and (2) fine grain structure to provide smoothness of work surface at the bottom of the passes.

A practical solution—The Nironite C Special roll is the answer that Mack-Hemp has developed to meet this problem. In this indefinite chill nickel-chromium alloy iron roll, depth of penetration is achieved by careful control of the carbon content. This results in deep penetration as well as less and finer graphite in the solidified iron. Hardness decreases very gradually as distance from the surface increases (see graph at left). Thus, this manipulation of carbon provides excellent wear resistance even at the bottom of deep passes. And the low graphite content which is assured by this special composition provides excellent surface condition at depths well below the original surface.

Nironite C Special rolls are only one example of the way Mack-Hemp can combine metallurgical research with nearly five generations' experience in the "art" of roll making to improve the performance of modern rolling mills. For help with your special rolling problem, write us today.

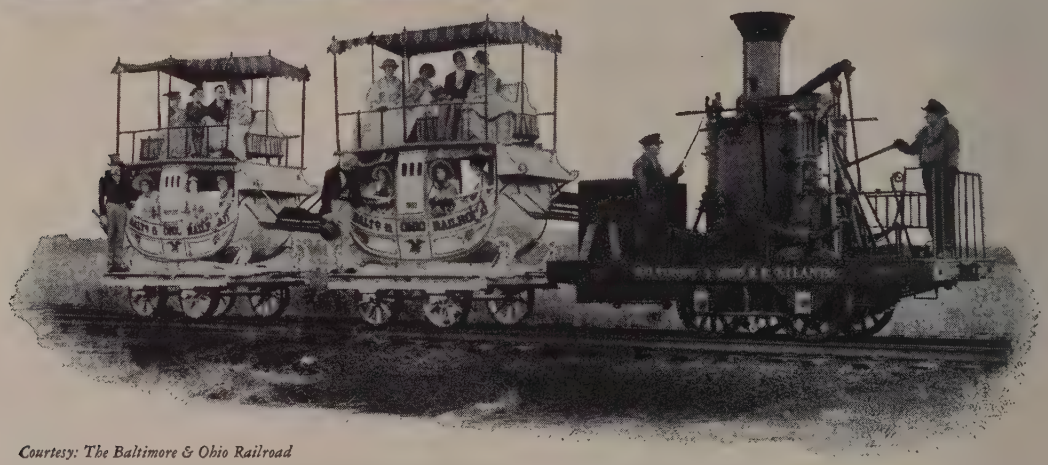
MACKINTOSH-HEMPHILL

You get more tonnage from the rolls with the Striped Red Wabblers

DIVISION OF **E. W. BLISS COMPANY**

FAMOUS FIRSTS IN THE IRON & STEEL INDUSTRY

HAND IN HAND THEY GREW...



Courtesy: The Baltimore & Ohio Railroad

As the need for heavier railroad rails grew, so did the iron industry. The first railroads began with wooden rails which were iron-topped. It was not until 1844 that "heavy", entirely iron rails went into production at the Mt. Savage Rolling Mill in Allegheny County, Maryland. It was 21 years later, in 1865, when the first steel rail was rolled from a Bessemer ingot at the North Chicago Rolling Mill Co.

One of the first "iron horses" to snort flame, belch smoke and cinders, and scare livestock was the "Atlantic". Built in 1832 by Phineas Davis in York, Pennsylvania, the "Atlantic" was placed into operation by the Baltimore & Ohio Railroad. In 1835 the "Atlantic" led a procession of trains into Washington, D. C.

As have the railroads and the iron and steel industries grown, so has BAKER'S MAGDOLITE, the original dead-burned dolomite. By continually improving their product through constant testing, today BAKER'S MAGDOLITE is always 5 ways better: Composition, Preparation, Economy, Strength, Quality. Specify BAKER'S MAGDOLITE, the original dead-burned dolomite, the next time you need dolomite.

6-35

ANOTHER FAMOUS FIRST

JEBCO PRODUCTS SINCE 1889

BAKER'S MAGDOLITE

The original dead-burned dolomite

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO

Technical Outlook

DEOXIDATION PRACTICE— A comparison of calcium-silicon and ferrosilicon deoxidation for E4340 steel shows that calcium-silicon gives fewer and usually shorter Magnaflux indications throughout the heat. That's what A. F. Sprangle, metallurgical engineer, Timken Roller Bearing Co., told the AISI at Philadelphia. A difference in inclusion types suggests an explanation. The calcium-silicon heat has more of the complex, globular-type inclusions than ferro-silicon heats. They show less tendency to elongate with hot-work reduction.

COOL GRINDING WHEELS— Lightweight cellular glass fragments that break under impact give a new approach to pore spacing in resinoid grinding wheels at Electro Refractories & Abrasives Corp. Previously such pores were formed by putting in naphthalene or other filler materials that evaporate in the wheel. The new method is said to give grinding wheels with longer life. High speed does not change the temper of metal being ground because the operation is fairly cool.

SUPERCRITICAL—At 1150°F and 4500 psi pressure, the newest steam turbine and boiler for the Philo plant of the Ohio Power Co. will be operating in the range where designers have feared to tread. To handle the supercritical heat and pressure, both turbine (GE) and boiler (Babcock & Wilcox Co.) are of radical design. Boiler tubing and steam lines were welded by the consumable backing ring process. The first stage of the turbine is contained in a spherical housing.

HIGH TEMPERATURE COATING— A flame-sprayed, nickel-magnesium-oxide, cermet coating is resistant to temperatures of 2000°F under oxidizing conditions, reports O. Hommel Co., Pittsburgh. Thermal shock resistance at this temperature is good. The coating has high insulating value. A thickness of 15 to 20 mils gives as much as a 700°F differential in temperature of the coated and uncoated sides of metal parts.

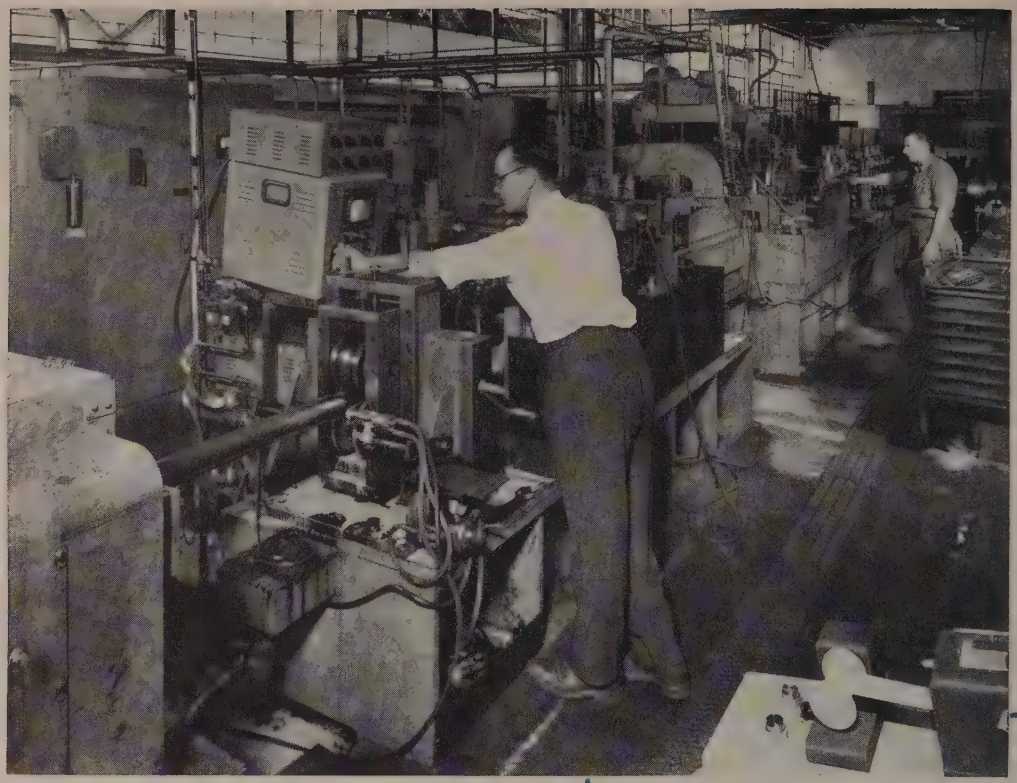
SAVINGS STICK—The Ternstedt-Trenton plant of GM ships parts in a glued-together carton stack that eliminates strapping. Cartons in the first layer are glued to a pallet and covered with a common lid. The next layer is glued to the lid, and so on up the stack. When the stack is broken down, the bottom cartons are left stuck to the pallet and re-used.

CARBIDE COAT—Tungsten carbide coatings are made by sintering powders, by flame plating, by gas plating, by flame spraying. Carboloy says it has another method, which will put an 0.030-in. carbide coat on such steel items as drill jig bushings and cylinder linings. A "truly" sintered carbide structure is the way Carboloy describes it.

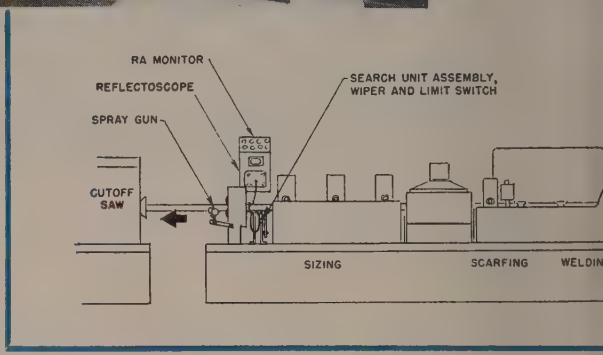
PERFECT METALS—Several years ago GE grew perfect crystals of iron. Now it has come up with six more—gold, silver, platinum, copper, nickel and cobalt, formed from the gaseous state. Pure copper crystals, tensile tests show, will withstand stresses of 600,000 psi. If bent and then heated, the crystals (in the form of whiskers) return to their original shape.

CONCENTRATED POWER—Two 83,000 hp motors—said to be the most powerful in the world by Westinghouse, their builder—will drive a 3800 mph gale in the new supersonic wind tunnel at the Air Force's Arnold Engineering Development Center, Tullahoma, Tenn. The 122-ton rotors spin at 600 rpm. Compressor blades (almost two-thirds of a ton each) are solid forgings rooted to discs.

alworking Outlook—p. 75 Market Outlook—p. 173



Weld inspection on the tube forming line at Saginaw Steering Gear



By LEO J. ADAMS
Metallurgist, Saginaw Steering Gear Div.
General Motors Corp.
Saginaw, Mich.

Weld Inspector Sees with Sound

ULTRASONICS is at work catching weld defects on a tube mill at Saginaw Steering Gear Division, GM. Horns blow, lights flash, air hisses, paint sizzles: The electronic system has taken over tedious mechanical inspecting chores, and is doing a better job.

The SAE 1020 tubing inspected at Saginaw is 3 in. OD with 0.065-in. walls. It is formed and resistance welded continuously from strip stock on an Etna, UK 30 tube mill equipped with a 180-cycle resistance welder. The product is used in the manufacture of automobile propeller shafts.

Eagle Eye — Ultrasonics has made continuous weld inspection possible. Each defect in the weld is marked as it comes off the mill. Poor welds caused by improper adjustment, laminations, etc., are brought to the attention of the operator by a signaling horn.

Immediate detection makes possible prompt adjustment, reducing scrap loss. Instantaneous marking assures 100 per cent inspection speeds up to 100 fpm.

Reflectoscope—The detecting vice is an ultrasonic reflectos manufactured by Sperry Prod Inc. Basically, it is a pulse erator which sends electrical o lations to a quartz transducer. transducer converts the electr oscillations into mechanical vi tions and transfers them to material being tested by con through a coupling agent.

These vibrations travel in

aight line until they reach a similar material which may ier be the end of the piece or iscontinuity. They are reflect- back into the transducer. The nsducer converts all reflected rations back into electrical os- ations and sends them back to reflectoscope.

The reflectoscope amplifies the trical oscillations. A sweep uit translates them to a cathode tube screen where they show as pips, which indicate the size location of defects.

rystal — The transducer used Saginaw Steering Gear is a 1 gacycle, X-cut quartz crystal in a plastic wedge at an angle generate surface waves in the erial being tested. The crystal pring mounted in contact with the tubing at an angle of 120 degrees from the weld bead, to eliminate initial pulse interference.

When no defects are encountered by the generated wave, it travels 360 degrees around the tubing back to the crystal. As a result, a pip is shown on the reflectoscope screen 360 degrees from the initial pulse. If a defect is encountered at the weld, a portion of the surface wave is reflected back to the crystal, and a pip appears on the reflectoscope screen at a point 240 degrees from the initial pulse (120 degrees to the weld and 120 degrees back to the crystal).

Gates—Locating the defect on the reflectoscope screen is made easier by superimposing gates over the pip representing the weld area. A gate is an electronically created jog in the reflectoscope trace (see sketch below).

A Sperry recording and signaling device identifies and measures the amplitude of defects at the weld zone. They are permanently recorded on a Brush recorder.

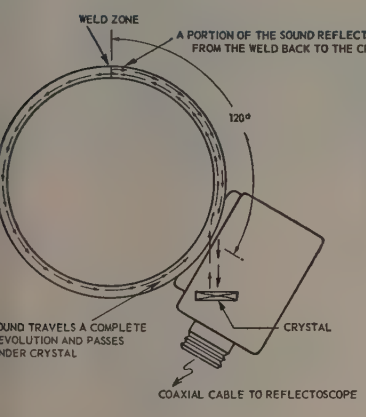
Measuring the size of the defect and marking defective tubing are done by a signaling circuit within the gated area. When this circuit is triggered, a 6.3-volt signal actuates a signal light, horn and solenoid-operated air valve. The valve supplies air to a spray gun which paints the defective section of tubing.

Old Way—Before ultrasonic inspection a four-step test procedure was followed:

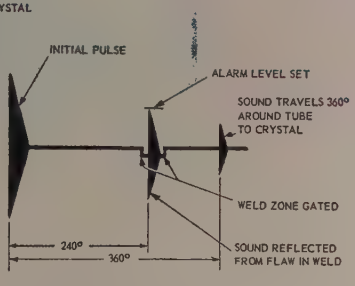
1. A 5 per cent minimum expansion test determined the ductility of the weld and tube. 2. A torsion test was used to determine ultimate strength. 3. A fatigue test simulating the most severe field conditions determined service life. 4. Each tube was checked 100 per cent hydrostatically for quality of weld.

New Look—Two months of extensive ultrasonic testing revealed that: 1. Every sample and all production during this period failing the 5 per cent expansion test were also rejected by the reflectoscope. 2. All tubing rejected by the reflectoscope and assembled into automobile propeller shafts for test purposes failed the fatigue test. No shaft passed by the reflectoscope failed. 3. Some types of failures rejected by the reflectoscope passed the hydrostatic test, but no tubing which passed by the reflectoscope failed the hydrostatic test.

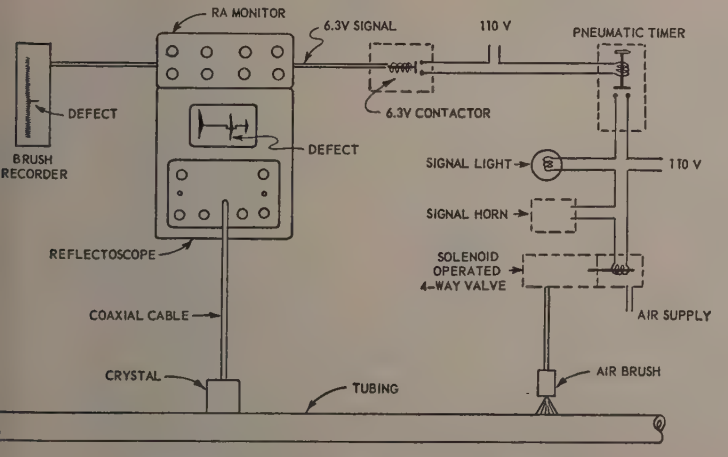
The conclusion: Ultrasonic inspection is either as good or better than all tests previously used. The ultrasonic method was incorporated into the manufacturing process, and mechanical tests (with the exception of the expansion test) are now used only for occasional spot checking.


WELD ZONE
A PORTION OF THE SOUND REFLECTS FROM THE WELD BACK TO THE CRYSTAL
120°
OUND TRAVELS A COMPLETE EVOLUTION AND PASSES NDER CRYSTAL
CRYSTAL
COAXIAL CABLE TO REFLECTOSCOPE

he crystal that sees through steel



Cathode ray tube display



Schematic layout of the inspection circuit

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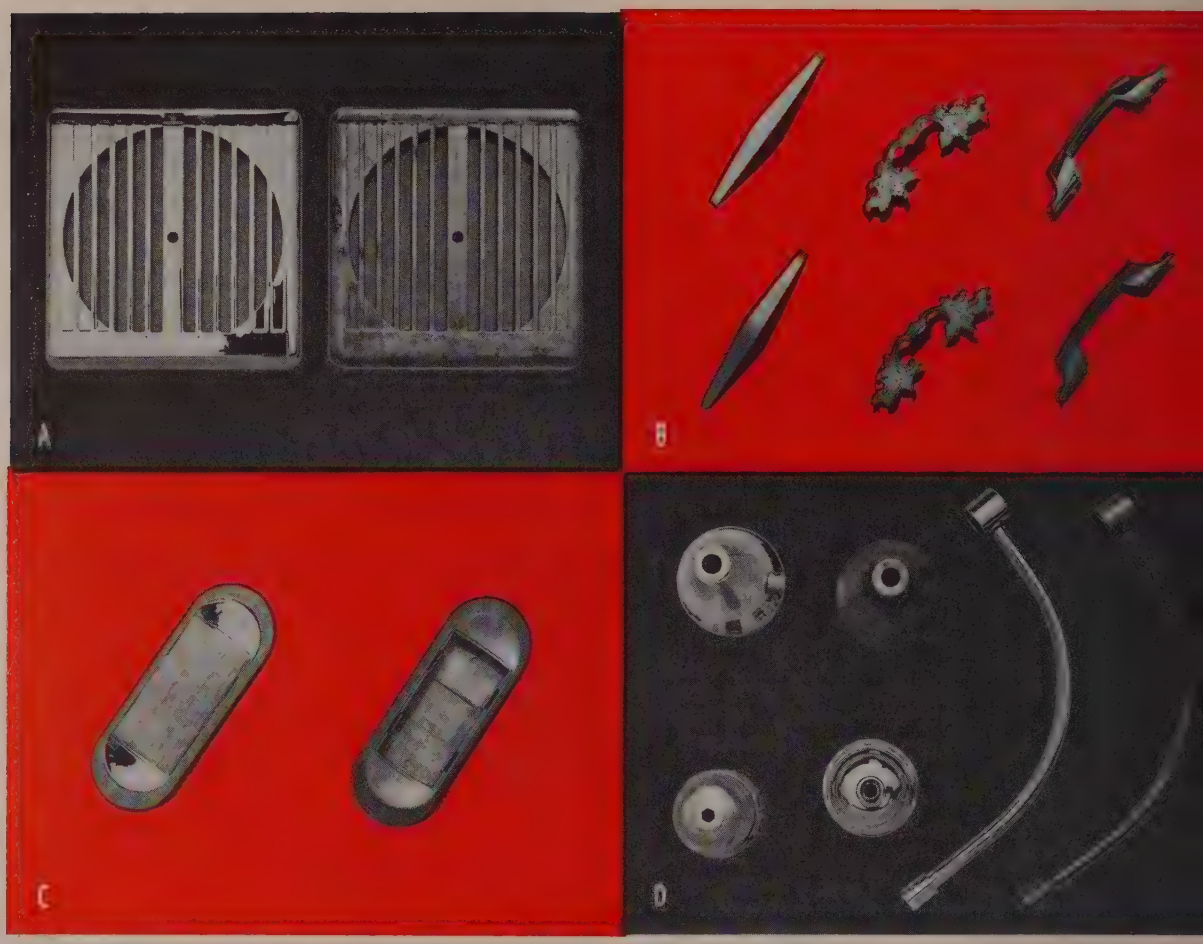

Look for vacuum metallizing on metal parts like these: A. Stamped grille for a kitchen fan. B. Die-cast drawer pulls. C. Die-cast automobile dome lights. D. Lamp parts

Lacquer Boosts Vacuum Finishing

By J. GORDON SEITER
Manager, High-Vacuum Division
F. J. Stokes Machine Co.
Philadelphia

AFTER 150,000 openings, the brass plated knob on one side of the factory door was worn to the base metal. The metallized and lacquered knob on the other side looked good as new.

Two years ago the metallized knob wouldn't have stood a chance. To appreciate the difference, you have to look at the lacquer.

It forms both base and topcoat for the metal film: Base, because the lacquer makes an ultrasmooth finish—the metal deposit reproduces exactly the surface on which it is deposited. Topcoat, because the metal deposit, 5 millionths of an inch thin, wouldn't stand a chance with abrasion if it weren't protected.

Prospects—There's little doubt that the recent success of metallizing has come from new developments in synthetic resins and lacquers. The process is only as good as the protective films, and the wear resistance of the newer films is excellent.

Vacuum metallizing is expected to move into applications where it has been considered impractical. Certainly, the day when it was limited to plastic toys and costu jewelry is past.

Electroplaters are interested vacuum metallizing because it a fast and inexpensive method putting decorative finishes items like hardware, applia parts and plumbing fixtures. I ready to compete with electrop ing for resistance to abrasion, spray and humidity.

A properly metallized film withstood the standard Ta abraser test, outwearing a copp chrome finish, and compari tests against copper-nickel-chro

finishes are being made now.

Capital Outlay—Vacuum metallizing units are available from $12,000 to $30,000. Baking ovens, lacquering equipment, trucks, racks and jigging fixtures mean an additional investment of $5000 to $10,000. The capital outlay for a complete setup: From $17,000 to $40,000.

If you want to go all out, you can add automatic conveyors, infrared ovens and automatic spray equipment. Floor space requirements vary from 2500 to 5000 sq ft for efficient operation.

Unskilled Labor — Because unskilled labor does the work, finishing costs represent a considerable saving over those of electroplating where hand buffing and polishing are required. It takes a green operator only a couple of days to learn to operate the unit.

Each evaporation uses about 10 cents worth of aluminum wire, enough to coat 5000 pieces of costume jewelry. Tungsten filaments cost about $8 per set and last for eight to ten "shots." Lacquer averages out to 25 or 30 cents per spider. (A spider is the fixture on which parts are racked for metallizing.)

As a result, cost of finishing one load is $2 to $3 for material. The main cost is labor for racking the pieces.

Within Limits—Of course, there are many applications where vacuum metallizing will never replace electroplating — automobile bumpers, for example. While the coatings are tough and durable, they can be gouged with a sharp edge and chipped by severe impact.

Aluminum diecastings are another problem. The base coat of lacquer tends to be absorbed into the diecasting with the result that it makes a rough finish. Diecastings need two or three coats for a glossy base. Powdered metal parts raise the same objection.

Color—Highly polished chromium, nickel or brass plated finishes are easy without hand buffing and polishing, and possibilities for color finishes are unlimited. The top coating or lacquer can be pigmented to simulate gold, brass, copper, etc.

Other colors are possible by dye dipping. The main objection to this method is that after several months of exposure to direct sunlight, the piece will fade.

Color Differential—Fading can be stopped by using pigmented top lacquers, but then recessed areas are likely to accumulate a heavier coating than the smoother areas. This will result in a color differential.

The nearest approach to color toning requires a single wipe of a cloth on the aluminized film immediately after evaporation. The toning effect, when covered with the top coat of lacquer, simulates hand toning of electroplated finishes.

Other Metals—Although aluminum is most common for the metallized film, other metals can easily be melted and evaporated. Aluminum is the only metal which will conveniently wet a tungsten filament, so to evaporate copper, gold, silver, etc., a molybdenum trough or boat is used to hold the metal. Resistance heating brings the boat to incandescence.

With this arrangement, the fixtures holding the parts have to be revolved on a planetary system so that each spider eventually will pass over the evaporation source. The vapors will not travel downward when the molten metal is in the trough.

The Latest — Recent developments in vacuum equipment for metallizing are faster pumps and larger chambers. A 6 ft diameter chamber, 5 ft long, can be pumped down to a vacuum of ½-micron within 7 minutes. For job platers and small processing plants, there is low-cost equipment stripped of refinements for semivolume production.

Vacuum metallizing of copper on nonconductive surfaces makes a base for electroplating. Vacuum metallized film can be bonded to vinyls or steel sheet and then embossed or stamped to get beautiful decorative effects.

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Lacquering Technique for Vacuum Metallizing

Vacuum metallized films are so thin they exactly reproduce the surface on which they are deposited. An almost perfect lacquer surface is necessary: 1. Below the metal film to prevent outgassing and fill in mold defects. 2. On top of the metal film to protect it from abrasion. There can be no runs, orange peel, sags, dry areas.

Several techniques to get perfect lacquer coating are in wide use:

1. Spraying—Hand spraying requires considerable skill. Electrostatic spraying is excellent although there are disadvantages if the shape of the piece is such that the lacquer will not reach all surfaces.

2. Dipping—Success requires either slow withdrawal of parts from the lacquer tank to eliminate runs, or fast withdrawal followed by spinning to remove excess lacquer and slow rotation to even out runs.

3. Flow Coating—Parts are first mounted on spiders, which then are mounted in a horizontal tank containing 2 or 3 gallons of lacquer.

The spider is slowly rotated while the clean lacquer cascades over the parts to be coated. After the parts are thoroughly washed with filtered lacquer, the spider is spun rapidly to remove the excess lacquer.

The entire spider is then transferred to a rotator which revolves it at 8 to 10 rpm for a 10 to 15 minute air dry. This evens out lacquer runs.

4. Baking—The lacquer coats must be baked. Baking time depends on the base material. With metals, it is usually ½-hour at 300° F.

5. Dyeing—After the top coat of lacquer has been baked for 10 minutes, parts may be given a few seconds' dip in a water-soluble dye. After dyeing, the parts, still mounted on the spider, are rinsed in water, then in a mild detergent to eliminate water spots. They are returned to the baking oven to set the color.

Fixtures and filler blocks adapt this outsized butt flash welder for a variety of uncommon shapes

Tooling with a Future

Production economy for aircraft parts is sired by utility for today's job with adaptability for tomorrow

By FRED EVANS
Asst. Master Mechanic
Cleveland Pneumatic Tool Co.

TEN YEARS AGO aircraft landing gears were made of multiple parts that could be readily machined on standard tools.

Today, many of these parts are of one piece or butt-flash-weld design and frequently require special machine tools for manufacturing.

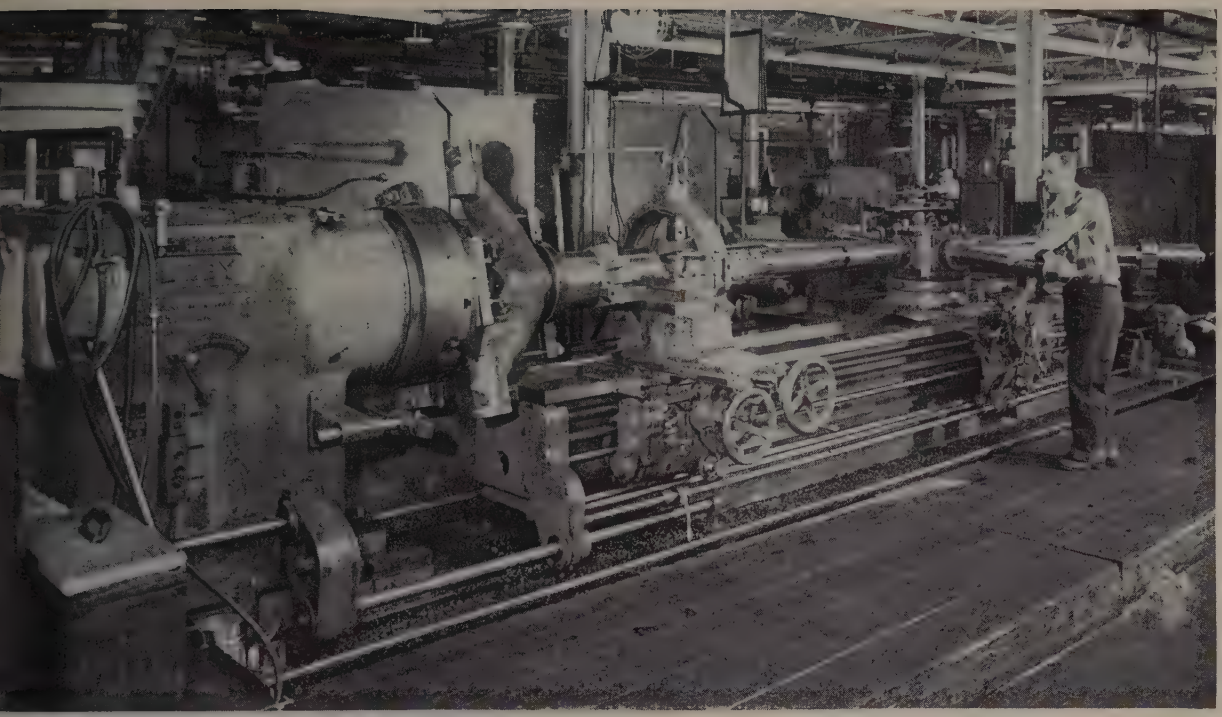
This constant change in landing gear design is a perennial problem. Special machinery and tools often can't be justified for such jobs because of low volume. Nor are standard tools always flexible enough to take the variety of odd shapes and large sizes.

It Can Be Done—Cleveland Pneumatic Tool combines a maximum of standard equipment with a maximum of special attachments to whip the problem. Gap-type turret lathes, wood pack boring, hydraulic or air tracer attachments, butt welders in place of hand arc welding, a special machine with adapters for a wide variety of parts—all balance production with economy of initial costs.

Gap-Type Turret Lathes — Not often found in production, this type machine can turn a wide variety of sizes, shapes. Often the part can be mounted on the turret and the chuck used to turn the tool, as in a boring mill. A mounting fixture is the only special part that requires change.

Some parts require internal, profile boring. Tracer attachments are used for this, as well as boring and internal and external grinding. Results show a 300 per cent improvement over the former, conventional method.

Wood Pack Boring—An old shop practice brought up to date uses hard maple strips as guides for the boring bar. The secret is a heavy flow of cutting fluid, 300 psi, to clear the chips completely. Result: A bore that is accurate



Wood pack boring produces a finish that is close enough to hone. Secret is a high volume of lubricant to clear chips

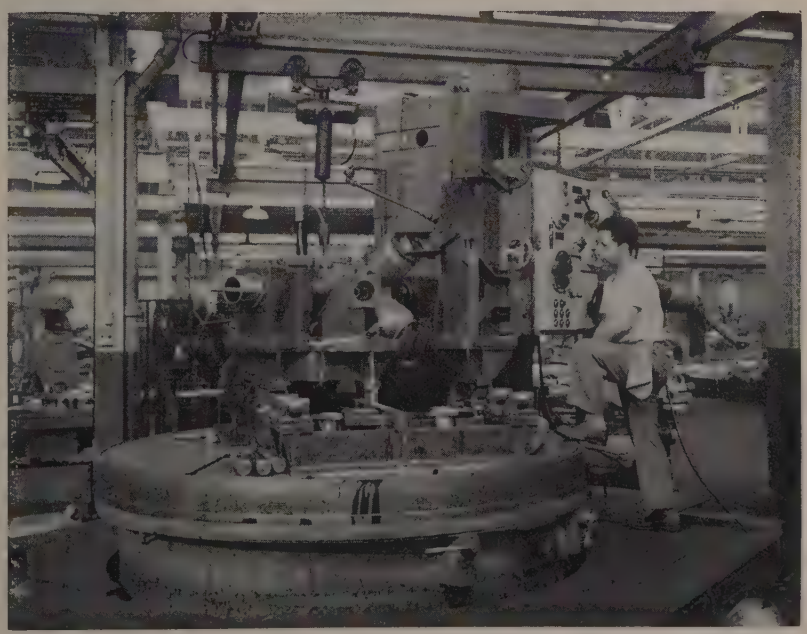
enough to hone immediately and eliminates an intermediate grinding operation.

Adaptable—Where special machinery is the only practical solution, every effort is made to provide adjustable, interchangeable features. One such machine uses four, individually powered, adjustable machining heads. The work is attached to a transfer fixture that can be moved through the three stations. Only the fixture needs to be changed to accommodate new designs.

Parts that used to be manually arc welded due to size are now being butt flash welded in a 1600 kva butt flash welder. This welder can accommodate alloy steel parts up to 18 in. in diameter and 67 sq in. cross section. Aircraft specifications were met, production improved 100 per cent, scrap forced down 70 per cent.

Such a large butt welder—a million pounds of upset force can be applied—might fall into the category of a special machine. But care in design satisfied versatility with a big bed to accept large or small parts.

Invention—Don't overlook invention in your own shop to adapt standard machinery to meet production needs. We modified a standard boring machine by stripping off the worktable and substituting one of our own design. The new table resembles one for a vertical lathe. An indexing type, each stop is adjustable. T-slotting allows an infinite number of positions for a fixture. With this modification, a specialized boring mill becomes a flexible production machine that will meet today's demands for conservation.



Shop inventiveness produced this indexing rotary table for a standard boring mill. If part specifications change, only the fixture is affected

Aluminum door panels for the fuselage skin are assembled on production lines with lightweight fixtures made from a laminate of epoxy tooling plastics and Fiberglas cloth

Plastics Speed Assembly

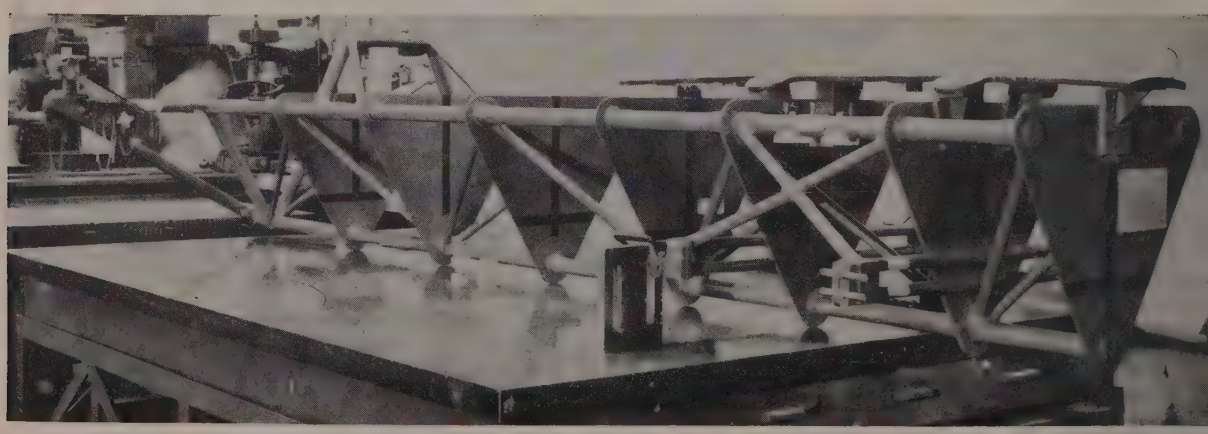
BUILDING a turbojet fighter like the Air Force's Voodoo calls for a large number of tools, jigs and fixtures to maintain tolerances and assure perfect fits.

McDonnell Aircraft Corp., St. Louis, found it could cut make-up time and costs about 40 per cent with plastic tools. The company uses a tooling compound developed by Ren Plastics Inc., Lansing, Mich., which is based on Bakelite epoxy plastic.

Lightweight—Dimensionally stable, the epoxy materials resist moisture, changes in temperature and humidity, as well as wear and abrasion. The plastic tools are about 75 per cent lighter than comparable metal tools.

The many tools needed to check, rivet and assemble a single part are quickly duplicated and reduplicated from master models surfaced with plastic.

Voodoo door panels are contoured to the shape of th plastic template. A second, female template complet the set. The tubular frames are also epoxy lamina



Epoxy laminates and reinforced epoxy tubing for the frame form a large inspection fixture for a Voodoo fuselage section at about one-fourth the weight of a steel tool

Look into REVERE Phosphor Bronze —it pays RAVENNA to use it!

This Moen Single Handle Mixing Faucet contains an anchor disc and an anchor washer, both stamped out of Revere Phosphor Bronze Strip. These are small parts, but in a fine product such as this faucet, high quality metals must be used throughout. Here is a condensation of the manufacturer's experience with the phosphor bronze:

Anchor Disc: • Standard punching speed maintained. • No pre-straightening off the arbor for the automatic punching process. • No excessive die wear. • Corners are sharp and clean; no de-burring needed. • Natural mill finish is better than they could achieve by tumbling or burnishing. • High tin content means no lubrication is required; they call it "silent brass."

Anchor Washer: • Have not had a single surface failure. • Dry tumble to de-burr. • Good fatigue characteristics and no obvious signs of corrosion.

Revere offers several types of phosphor bronze, each with slightly different characteristics. In addition to this alloy, Revere also supplies Ravenna with round and octagonal leaded brass tube and free-cutting brass rod, for use in various parts of the valve. We will be glad to collaborate with you on selection of just the right forms of the correct alloys for your products, present or projected. See the nearest Revere Sales Office.

Moen Single Handle Mixing Faucet, made by Moen Valve Co., Division of Ravenna Metal Products Corp., 6518 Ravenna Ave., Seattle 15, Wash.

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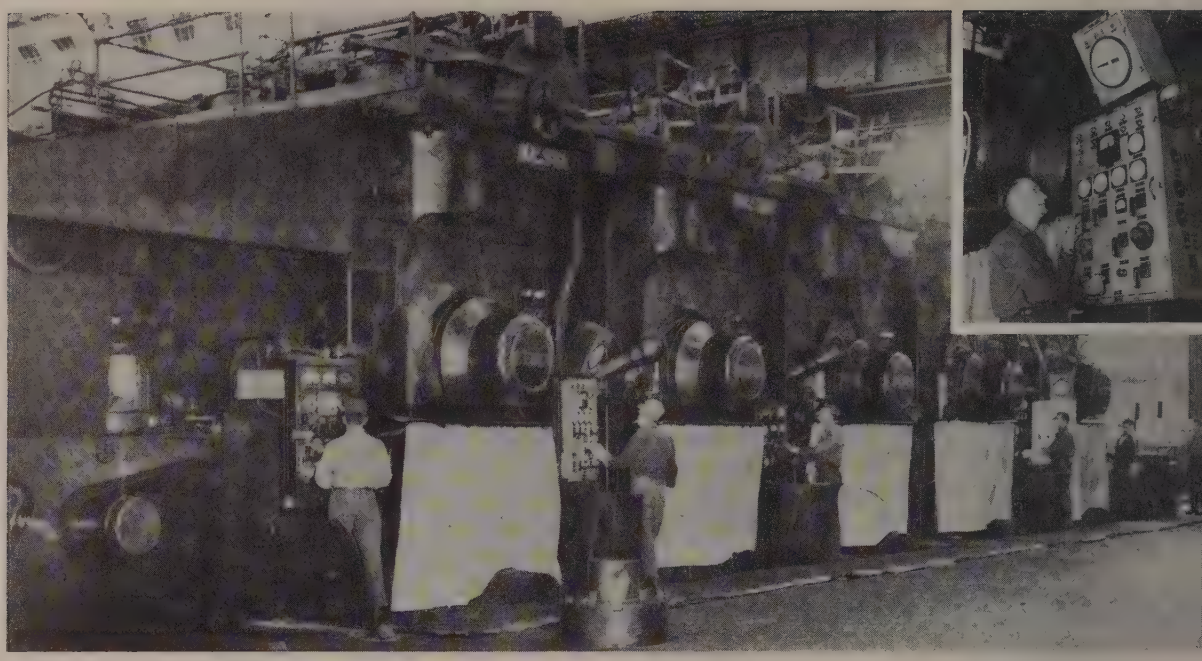
"The Revere Four-Way Service" is a 16 mm. sound motion picture in color, educational and informative. If you haven't seen it, write nearest Revere Office.



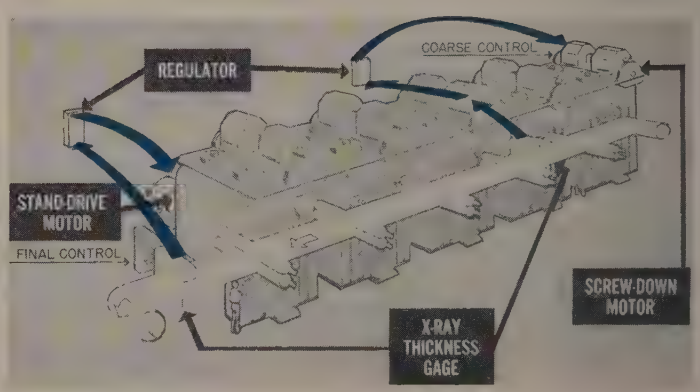
Thickness Gage That Thinks

Automatic gage control steps up quality by giving the user closer tolerance strip. In the mill, worker fatigue is reduced, and there's less waste due to off-gage steel

COLD-ROLLED STRIP coming from the 5-stand tandem mill (above) at U. S. Steel's Irvin Works is automatically kept to a tolerance of ±0.0001-in. Dials on the control box (above) do the job by holding down variances beyond set limits on the fast moving strip.

It's the first over-all thickness gage in the steel industry to use a screwdown control to link reduction on the first stand with a vernier system operating on the roll speed of the last stand, according to W. E. Miller, manager, steel mill systems engineering, General Electric Co., Schenectady, N. Y. The system resulted from a joint project by GE and U. S. Steel.

Coarse Control—In the screwdown regulator (coarse control) an x-ray gage is mounted between stands 1 and 2, to measure strip thickness out of stand 1. Desired

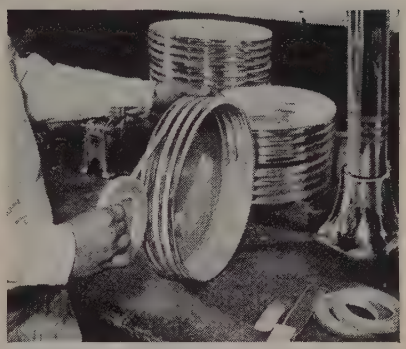


Two methods are the basis for the automatic gage control system: A coarse control uses an x-ray gage between stands 1 and 2 hooked-up to operate screwdown motors on stand 1. For fine control, a vernier system uses an x-ray gage after stand 5 with a regulator to vary stand drive speed to control gage

think of TAPE!

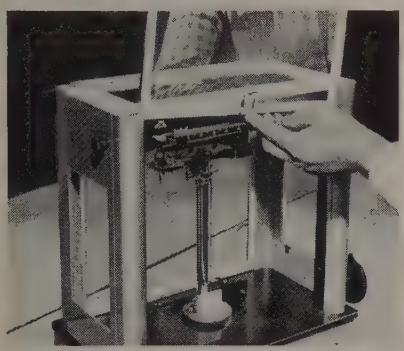
OUBLE-COATED Tape, applied to bed of lling machine, holds metal parts in place ring machining; eliminates need for time-nsuming clamp or fastener set-up. Avail-le in widths up to 36″.

FILAMENT Tape bundles metal pipe, tubing, rods, bars. Tape has up to 500 lbs. tensile strength per inch of width; exclusive "mirror-surface" adhesive puts it all to work.

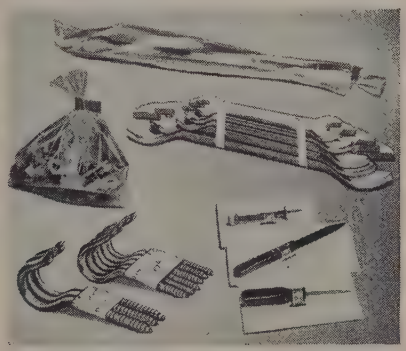


ACETATE FIBRE Tape adds attractive color to fountain stools. Tape comes in 12 eye-pleasing colors; long life adhesive holds up under temperature extremes—actually sticks at below freezing.

ASKING Tape is an "all-around tape tool" many uses. Above: Auto manufacturer es tape to hold vibration shims to auto mes until body is bolted to the chassis.



PLASTIC Tape cushions glass panels against vibration; makes effective glass-to-metal dust and moisture seal. Tape is applied to edges of glass before application of metal frame.



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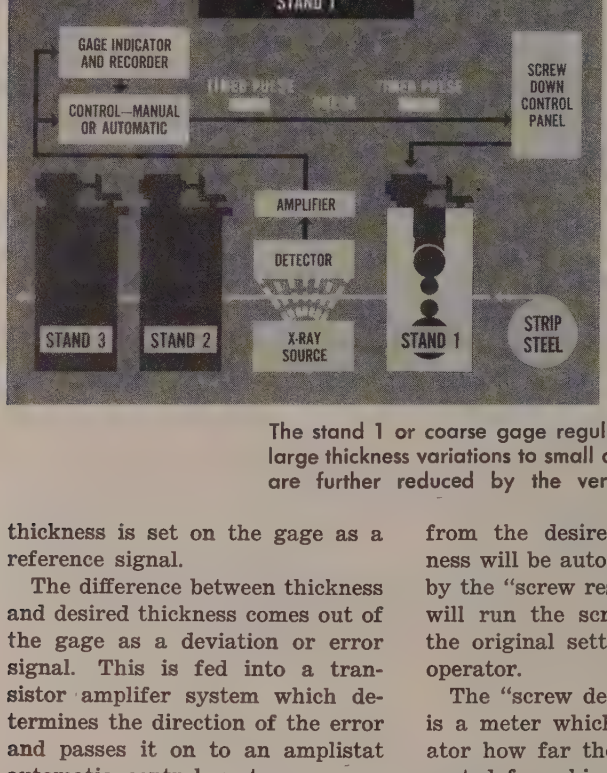
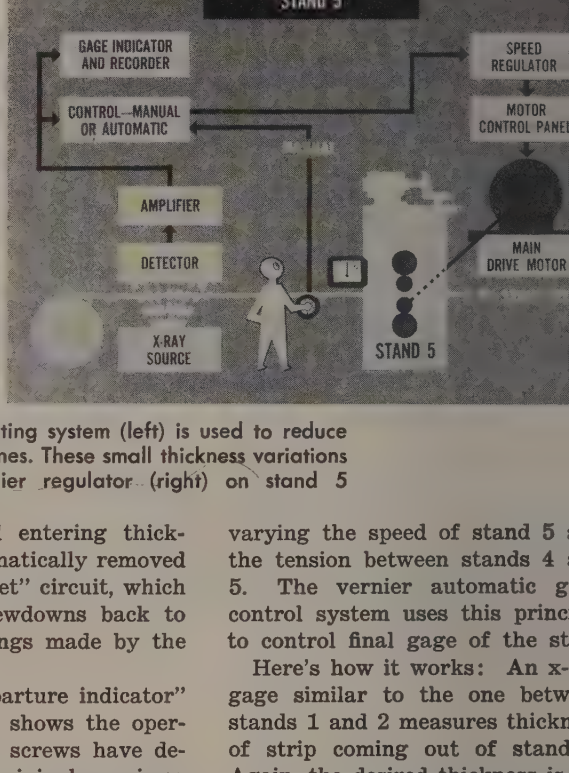




The stand 1 or coarse gage regulating system (left) is used to reduce large thickness variations to small ones. These small thickness variations are further reduced by the vernier regulator (right) on stand 5

thickness is set on the gage as a reference signal.

The difference between thickness and desired thickness comes out of the gage as a deviation or error signal. This is fed into a transistor amplifer system which determines the direction of the error and passes it on to an amplistat automatic control system.

Compensates — If strip coming out of stand 1 is 0.0005-in. off-gage, screwdown motors run for a shorter time than if the error were 0.001-in. This means screwdown motors are required to jog less frequently to bring the thickness back into tolerance than if the timed pulses or "on" times were always equal.

A check interval is allowed between timed pulses to permit the strip to get from the rolls of stand 1 to the x-ray gage position before the automatic control makes any further correction on the screwdown motors.

More Help — Several auxiliary functions are incorporated into this coarse regulator — such as automatic screw reset, screw departure indicator and screw departure limits.

Most off-gage steel going into the cold mill is at the beginning and end of the coils. The operator will select a normal screw opening which will give him on-gage tolerance during mill acceleration. The automatic gage control will maintain the desired thickness over the entire strip. At the end of the coil, any deviation of the screwdowns from the desired entering thickness will be automatically removed by the "screw reset" circuit, which will run the screwdowns back to the original settings made by the operator.

The "screw departure indicator" is a meter which shows the operator how far the screws have departed from his original openings.

Avoids Trouble—There will be times when the automatic gage control will want to run the rolls too far apart or too close together. This might lead to trouble: If the screws open too wide, slippage will occur. If the rolls are too close, the stand motor might be overloaded and shut down the mill.

The "screw departure limit" looks for trouble like this: It disconnects the automatic control when preselected limits are reached. At the same time, an alarm light is turned on to tell the operator that his control is off automatic.

Another auxiliary is automatic "regulator inspection." If the regulator does not reduce thickness error during a preselected time limit, it is removed from operation. Again, the operator is notified by a signal light.

Fine Control—The job of stand 1, or coarse gage regulating system, is to reduce large thickness variations to small ones. Then another control goes to work. It's the vernier regulator on stand 5 where small thickness variations are further reduced.

Thickness of the strip can be controlled over a limited range by varying the speed of stand 5 the tension between stands 4 5. The vernier automatic g control system uses this princ to control final gage of the st

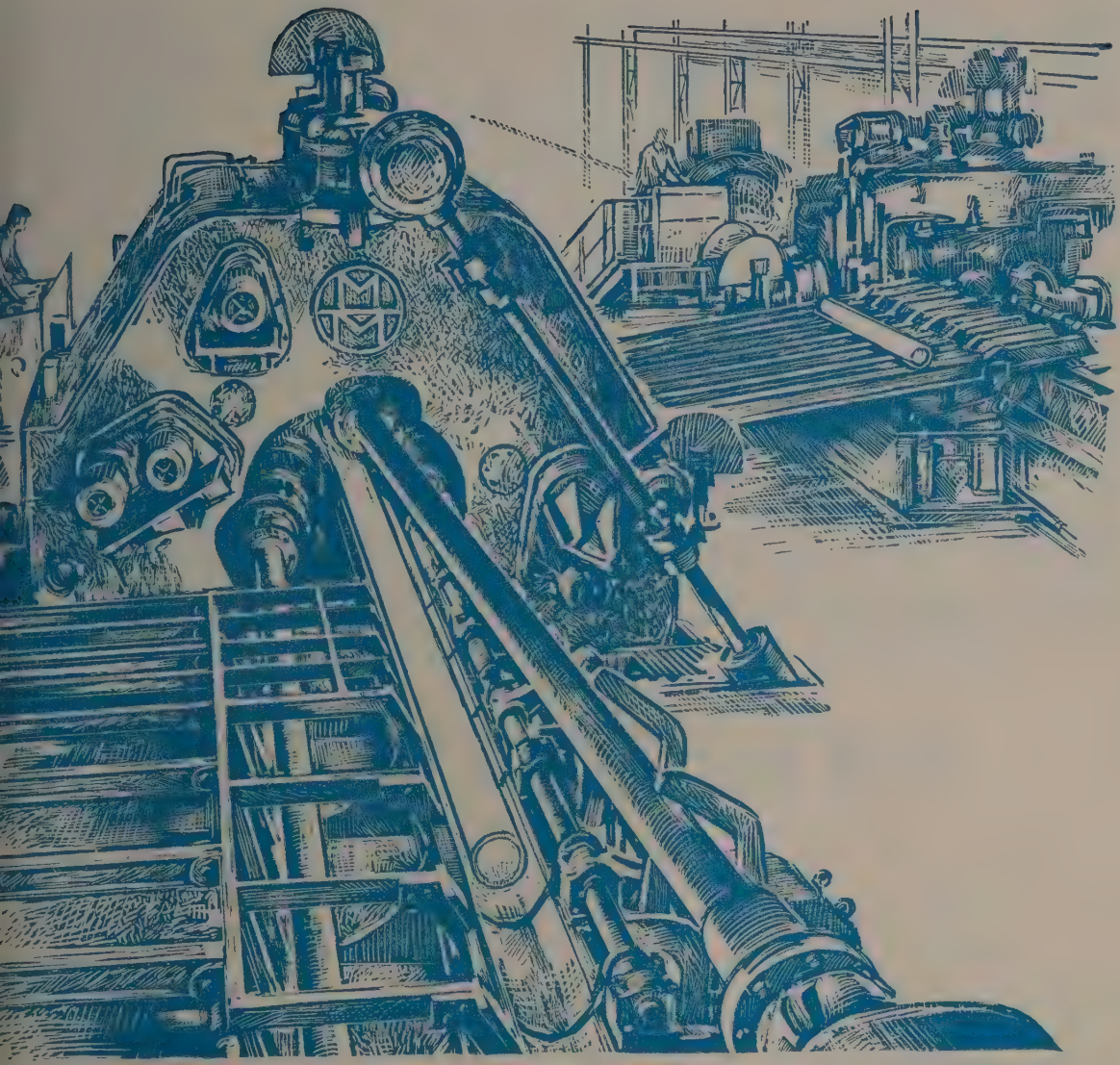
Here's how it works: An x- gage similar to the one betw stands 1 and 2 measures thickn of strip coming out of stand Again, the desired thickness is on the x-ray gage as a refere signal.

The gage measures thickn The difference between it and sired thickness is fed into the tomatic gage control circuit a deviation or error signal. A tr sistor system amplifies it to a p er level suitable to be fed into motor speed regulator.

Trouble Shooters—As was case with the screwdown syst the vernier system also has a iliary functions.

Since the regulator must ne sarily have a limited range to p vent looping and breakage, th must be a way to tell the opera when the regulator is out of ra —so that he can make manual justment of either screw setting vernier speed control.

An "operating range indicat is mounted on the operator's c inet. As long as the meter sh within range, there are no p lems. But if the meter hand g to one end of the scale and st there, a light goes on to tell operator that the regulator is of range and that manual adj ments must be made on the trol for stand 5.



THE WORLD'S LARGEST ASSEL MILL

This mill, recently shipped by Mannesmann-Meer, is another example of their engineering and manufacturing capabilities. Supplied to one of the world's foremost bearing manufacturers, this mill is capable of rolling up to $8^1/_2$" OD., heavy wall shells, and it has many design and operating features not available on previous assel mills.

Progressive thinking backed by over 65 years of experience in mill operating and mill design makes it possible for Mannesmann-Meer to offer you a combination of

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WORLD SPECIALISTS IN HIGH-SPEED TUBE MILL MACHINERY

Note signaling system on ductwork of salt bath furnaces. It permits precise timing of every work batch

Salt Bath: Case for Gears

By J. L. RAYNIAK
Vice President
Johnson Motors Division
Outboard Marine & Mfg. Co.
Waukegan, Ill.

Transmission gear for outboard motor has been case hardened by liquid carburizing process to RC 60-62

WE'VE cut finishing costs due to heat treating distortion from 7½ to less than 2 cents on each spiral bevel gear for our Sea Horse outboard motor.

Reason: Our salt bath holds both ID and OD of hardened gears under 0.001 in. total out of roundness.

The spiral bevel gears are machined from SAE 4615, cold-drawn steel, then salt bath case hardened. Only two finishing treatments are required: Honing the inner diameter and hand lapping the thrust face.

There's no decarburization; gears have uniform hardness and good yield strength.

Setup — Five internally heated salt bath furnaces, made by Ajax Electric Co., Philadelphia, constitute our inline production setup. They have a combined connected load of 210 kw.

Process—Gears are racked on tree-type alloy fixtures that accommodate 12 gears. Fixtures are supported on horizontal rods (five per rod), and immersed in the 1675° F carburizing salt for 2½-hours.

Carburizing furnaces have a capacity of four rods loaded with fixtures, or 240 gears. T working dimensions average 2 x 15 in., with 18-in. salt d Water soluble carburizing with 12 to 16 per cent cya content, are used.

Reheated — Gears are t from the bath and air coole room temperature, then imm in a 1525° F bath and reh for 30 minutes. (Reheating mizes the amount of retained tenite in the hardened case. cessive retained austenite w impair the yield strength and mote spalling or cracking.) quenching, washing, rinsing, ing and tempering at 325° F 1½-hours complete the treating cycle.

The hardened gears hav 0.020 to 0.025-in. case depth a hardness of RC 60-62. Since ting in the salt bath method, all heat treating and finishing have been cut 70 per cent.

ese jet engine parts formerly were drawn and machined. ow turning cut machining 40 per cent

Flow Turning Bridges the Gap

ORD'S Aircraft Engine Division using flow turning to make four engine parts like the one above. s so successful that 23 more rts will be added to the regular oduction schedule during the ming year.

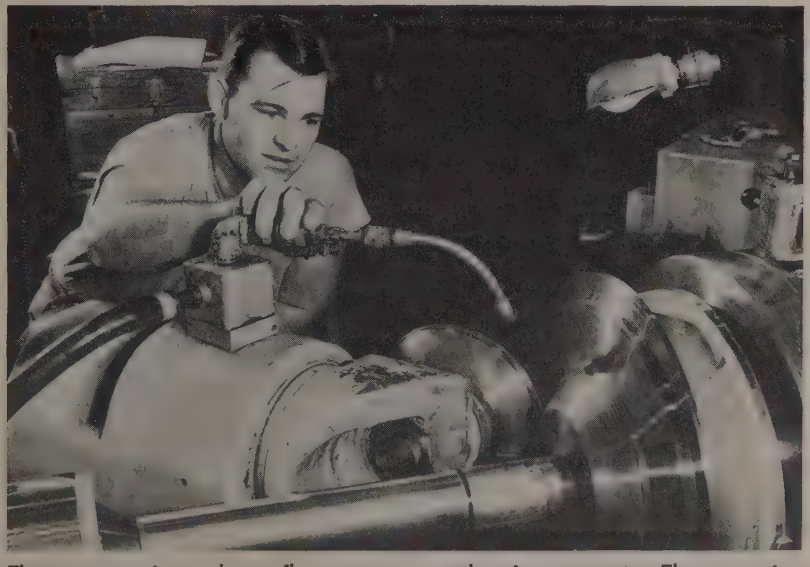
The savings—40 per cent in ma-ining and reduced scrap—pave e way. In one case, flow turn-g saved 85 lb in the rough forg-g stage.

Application—Ford maintains a emiproduction" department as a ouble shooting section, ready at moment's notice to turn out any rts general manufacturing or ndors can't produce on schedule. ey found flow turning fitted the l and added a contouring at-chment of their own design. eir own machinists now can rn out regular production on ort notice.

If you're looking for a tool to pplement your regular produc-on program and to fill the gap emergencies, flow turning may the answer. Once a part has en developed beyond the design stage, a small investment in an arbor, contour template and roll is needed.

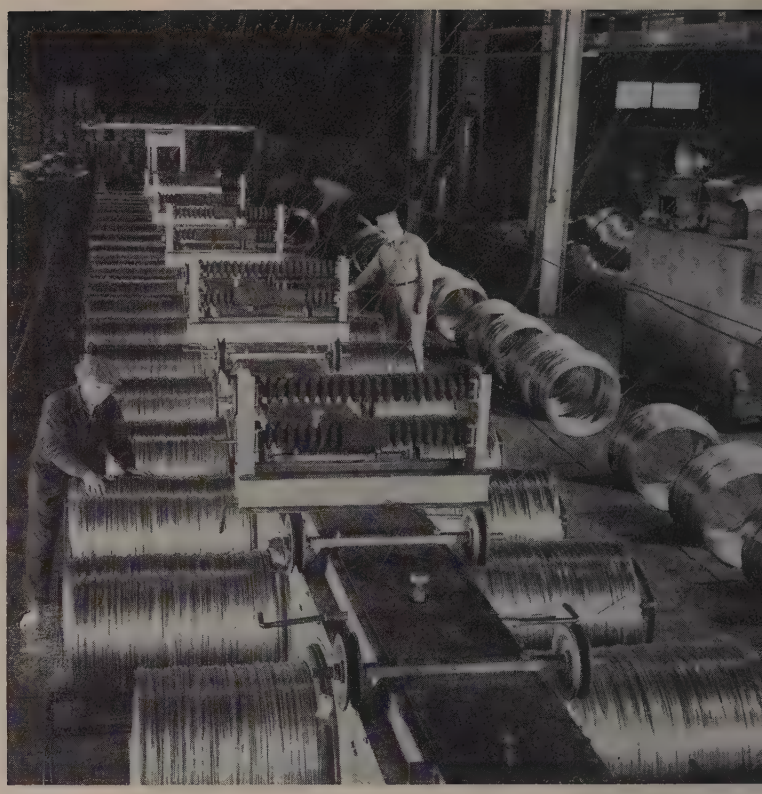
Development—In order of importance, the rough part design comes first. Following are arbor design, roller selection and proper adjustment. The final phase requires rework of the roller, arbor and blank or rough shape. In these, the operator plays an important part.

Skills—Operation of a flow turning machine can be learned quickly by a machinist.



The operator is ready to flow turn a rear bearing support. The operation takes only 2 minutes

Highlights on wire descaling, inventory control, sales forecasting, lime coating . . . from the meeting of the Wire Association



Jones & Laughlin Steel

Descaler Cleans Rods with Cut Wire

ELECTRONICS, about to enter the wire industry, is expected to make quick work in determining the balance between inventory and production items.

German wiremakers have developed something new in the art of cleaning the surface of wire rods in multiple strands.

Those two innovations were the high points at the technical sessions of the annual meeting of the Wire Association, Chicago, Nov. 14-17.

Orders Speeded—T. M. Girdler Jr., assistant division manager, Union Drawn Steel Division, Republic Steel Corp., Massillon, O., announced that his plant was installing electronic equipment to expedite orders through the mill.

To get an order from the West Coast to the plant by mail and route it through channels may consume three weeks. When the electronic system begins to function in the near future, orders will be moving through the mill within a few hours after receipt.

Descaler—The rod descaling method was described by A. O. Kogel, manager, Westfalische Drahtindustrie, Westphalia, Germany. Equipment includes a take-up frame, lime bath, pulling mechanism, descaling machine, straightener and pay off reels.

The descaler consists of three individual rolls, each designed to handle 24 strands of rods up to ¾-in. The rolls are installed in train, but are so mounted that the 24 strands become arranged in an equilateral triangle while in transit. Cut wire, 0.0157-in., and known as No. 170 shot, is employed as the abrasive.

Fast Work—Speed of the rod through the descaler is 40 to 60 fpm. The shot blasting wheels, which operate at 2400 rpm, deliver the cut wire abrasive at 15,000 fpm, to assure uniform cleaning of the wire rods on all sides. About 2¼-lb of cut wire are used per ton of rods cleaned.

Cost of cleaning rods by this method averages $2.50 per ton. Coils are welded together at front of the line to permit tinuous operation. The pro is being used for low-carbon but a plant is to be built for essing high-carbon stock.

Watch Inventory—Study o dividual merchant trade items result in establishment of mum and maximum inventory serve as a guide for sales, pro tion and operating departm said J. L. Sanderson, superint ent of wire mills, Keystone & Wire Co., Peoria, Ill. Inven control at his plant began a complete survey of all in ing orders and the metho processing them over a perio years.

Mill orders, he explained to symposium on production sch ing, should give adequate info tion, such as manufacturing cedure and shipping instruc so that the mill manager is ab set up his schedule a week in vance.

Questions submitted to

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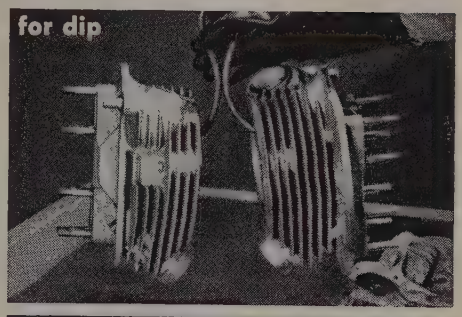

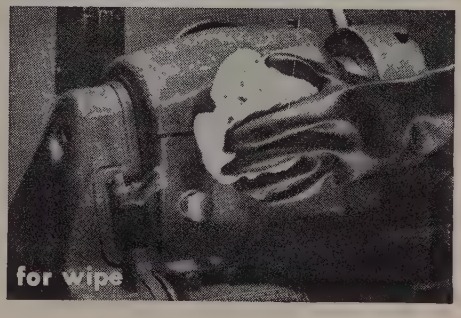

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SPIRAL BEVEL—Sizes from 16 pitch, 1½" dia., to 1½ pitch, 28" dia.

STRAIGHT BEVEL—Sizes from 16 pitch, 1½" dia., to 1½ pitch, 28" dia.

HYPOID—Sizes from 1½" to 28" dia.

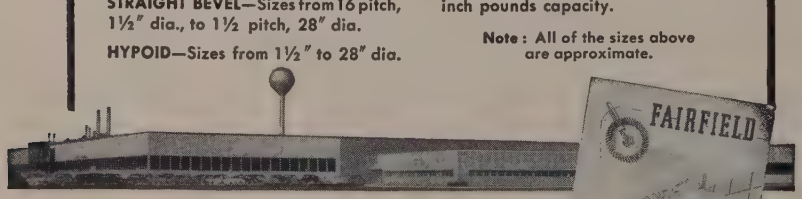
ZEROL—Sizes from 16 pitch, 1½" dia., to 1½ pitch, 21" dia.

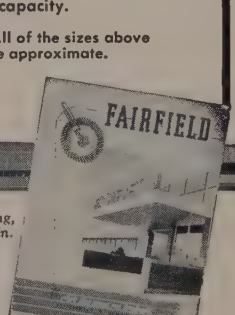
WORMS AND WORM GEARS—Worms to 7" dia. Worm gears to 36" dia.

SPLINED SHAFTS—Lengths to 52". Diameters from 1" to 6".

DIFFERENTIALS—10,000 to 300,000 inch pounds capacity.

Note: All of the sizes above are approximate.





Ask for interesting, illustrated bulletin.

FAIRFIELD MANUFACTURING CO.

2313 South Concord Road • Lafayette, Indiana

symposium brought out the o ion that the sales department any wire mill should not be lowed to schedule more than 8 90 per cent of theoretical capac

Crystal Ball—Accurate s forecasting is one of the diffi ties facing the wire industry. S wire-makers stated it involve forecast of trends of all phase business.

Caution was expressed by executive that sales forecast should not be taken too litera Every attempt should be made evaluate trends. They may the mold for the next th months, but any change in market will obsolete the forec

Problem Lime — Quickli slaked under ideal conditions, duces a hydrated lime suspens more ideally suited to wire dr ing than commercial hydra lime, according to T. C. Mi technical director, Industrial s division, National Gypsum Buffalo. The benefit of a hig specific surface for freshly sla lime offers greater potential an improved coating as a gre carrier.

The major lime problem is increase in coarse particles b produced in slaked lime susp sions which result in inferior c ings, Mr. Miller pointed out. by admitting live steam to slaked lime suspensions, bath t peratures below 200° F will maintained.

Any heat above this temp ture will be dissipated by the la volume of water in the bath atmospheric pressure. A few stallations using live steam s no evidence of crystalline sla lime after several months op tion.

Simple Cable—Only two terials are used in a new typ mineral-insulated electrical c rated at 600 volts: Copper for conductors and seamless o sheath, and highly compre magnesium oxide for the ins tion. This was brought out G. S. Eager Jr., assistant dire of research and S. P. Lamber research supervisor, General C Corp., Bayonne, N. J. The c is self-contained within the se less sheath and is the first general use to be completely flammable.

This furnace is one of the largest used for stress relieving. Castings or weldments up to 50 ft long are placed in position and blocked on the insulated flatcar

Big Stress Reliever

STRESS RELIEVING welds in huge castings and weldments is easier, thanks to a new furnace (50 x 20 x 15 ft) at Morgan Engineering in Alliance, O. Equipped with two-fuel combination burners, it can heat a 250,000 lb load to a maximum of 1750° F in less than 9 hours.

Controls—Raising the temperature of heavy castings 200° F per hour requires careful control to prevent induced stresses, especially in castings with sections of greatly varying thicknesses.

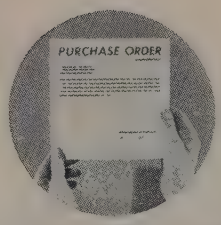
The electronic control system provides for a 25° F differential. If a thin section becomes hot faster than the thicker sections, the furnace is slowed down to allow a longer soaking period and time for the thicker sections to reach the same temperature.

The furnace heat chamber is divided roughly into three zones for temperature control. Pneumatic potentiometers equipped with circular charts regulate and indicate the temperatures. A built-in programmer times the rate of heating, length of soak period and furnace shutdown.

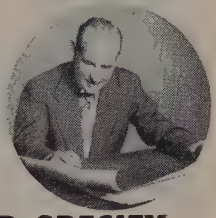
Safety devices are locked in with the controller to provide positive shutoff in case of overheating, power or fuel supply failures.

Burners — At maximum output, 48 burners provide 33 million Btu per hour. Each one can burn either gas or oil. Combustion air is provided from a central blower powered by a 50-hp motor. As shown in the illustration (above), the burners are mounted in ports arranged along the top and bottom of both sides of the furnace.

Work—A brick insulated flatcar as long as the furnace moves the work into the furnace. A chain puller supplies the moving power. The bulkhead-type door is a part of the car—as the car moves into the furnace, the door also closes. Sand seals the opening between the closed door and the furnace door frame.



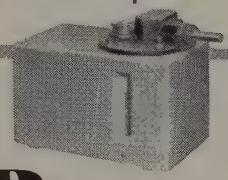
WHETHER YOU BUY...



OR SPECIFY...

This Unit Is The Answer To

- *production waste*
- *design problems*
- *fire risk*
- *excessive repair bills*



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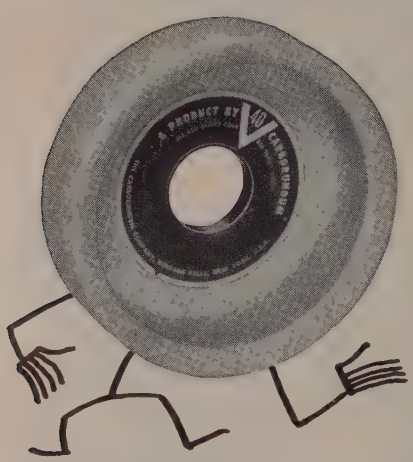
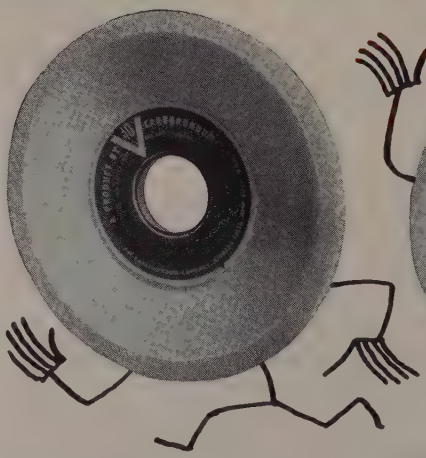
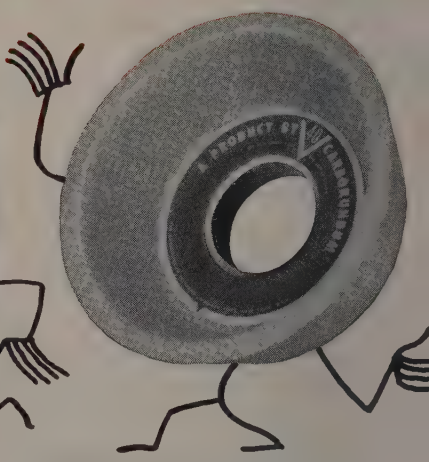


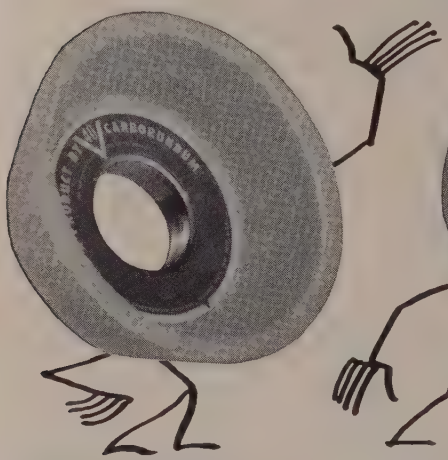
ON HIGH SPEED STEEL:
"Holds form twice as good. Does not burn or load."



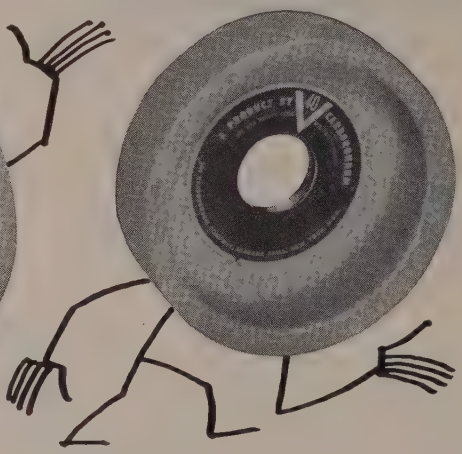
STEEL SAW RESHARPENING:
"Held size...smooth and cool cut... no burn."



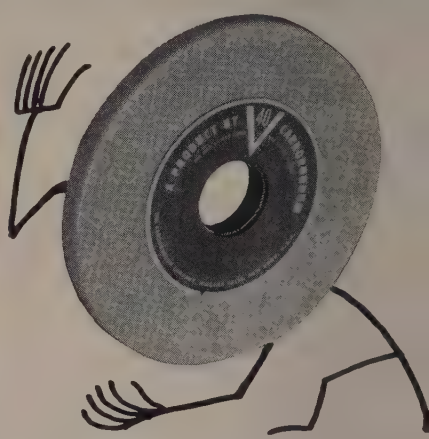
ON HIGH SPEED STEEL DIE BUTTON:
"Less heat, no burn and allows heavier stock removal per pass."



BROACH GRINDING:
"Three times the production... much cooler cutting."

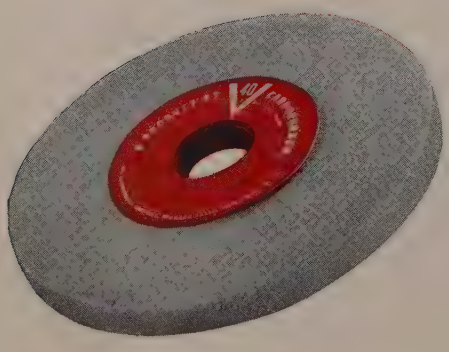


DRILL GRINDING:
"Three times the production...no chatter on small drills...no burn...better finish."



ON HIGH SPEED STEEL FLAT FORMS:
"Gave cuts up to .040" with very little breakdown."

"V-40 IS



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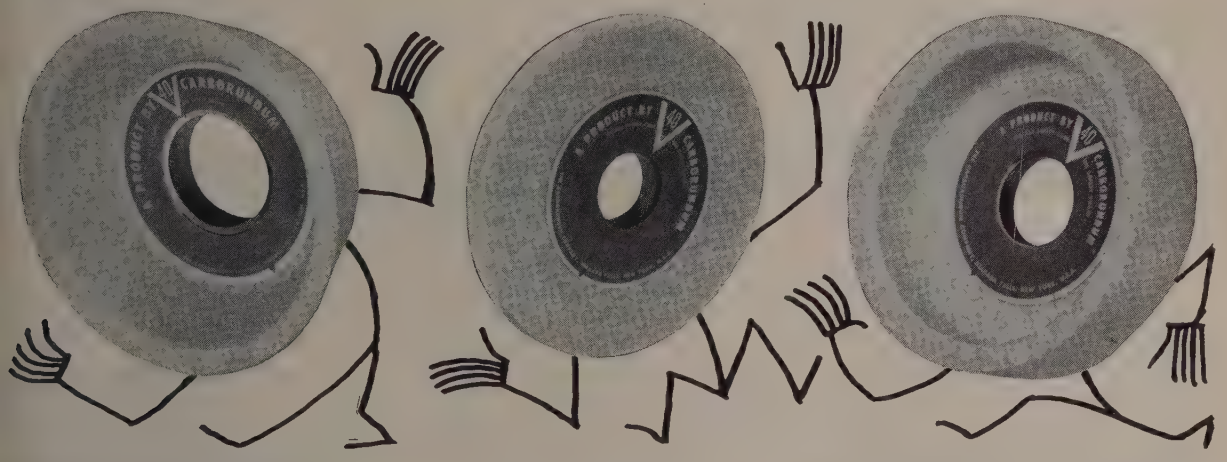
"Dresses with ease...better finish and cuts more freely."

GEAR CUTTER GRINDING:
"Much less wheel breakdown. No burn."

ON SOFT STEEL:
"Superior in all respects."



CIRCULAR BROACH GRINDING:
"8 broaches per dressing against normal 3."

ON CHROMOVAN DIES:
"Excellent size control. Gave cuts of .010" with very cool work."

SIDE MILLING CUTTER GRINDING:
"Held size around the cutter. No burn on cutter."

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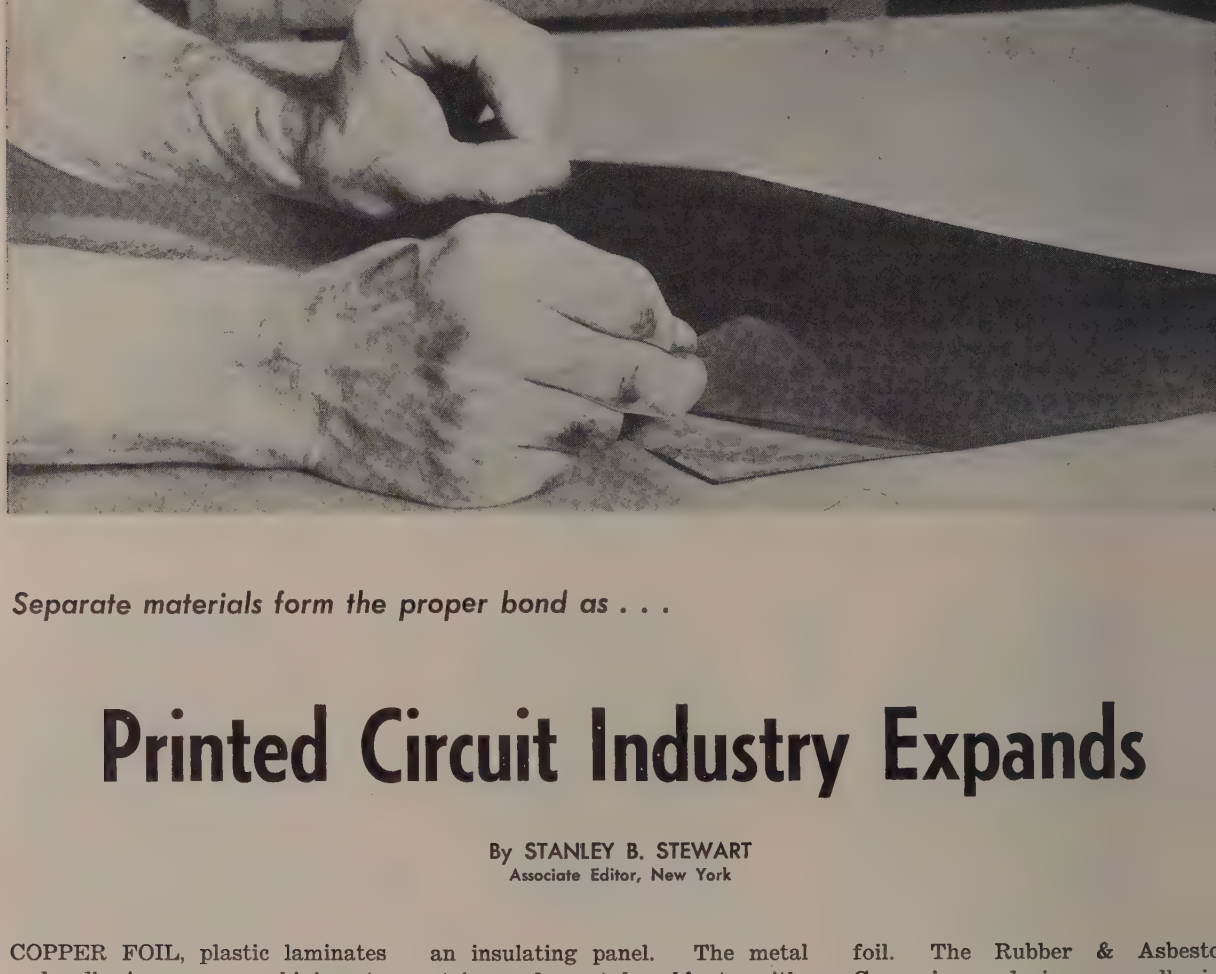


Separate materials form the proper bond as . . .

Printed Circuit Industry Expands

By STANLEY B. STEWART
Associate Editor, New York

COPPER FOIL, plastic laminates and adhesives are combining to bring the printed circuit industry a more workable "board."

History — Printed circuits have been produced by: 1. Plating metal patterns on plastic boards. 2. Spraying metal into depressions in plastic plates. 3. Bonding rigid wiring harness to a plastic base. 4. Fusing silver ink patterns on ceramics. 5. Etching metal-clad thermosetting plastics (the most popular).

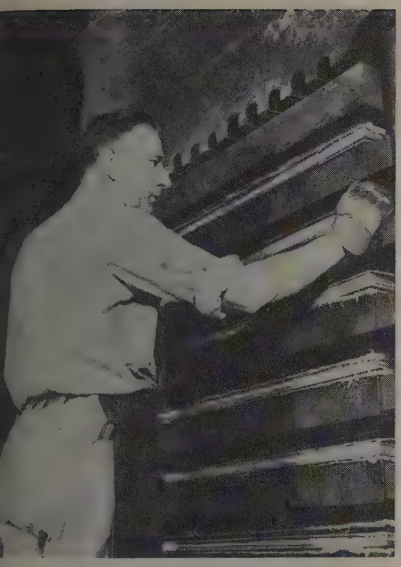
While copper is the most widely used material, silver and brass are excellent current carriers. The problem: Finding suitable adhesives to provide an adequate bond. Aluminum bonds well but runs into difficulty when it comes to soldering.

Printed circuitry is reducing the number of conventionally wired connections between electronic components (resistors, coils, sockets) by using a series of thin metal conducting strips bonded to an insulating panel. The metal strip used must be able to withstand high soldering heats and be capable of being securely bonded to a laminate base.

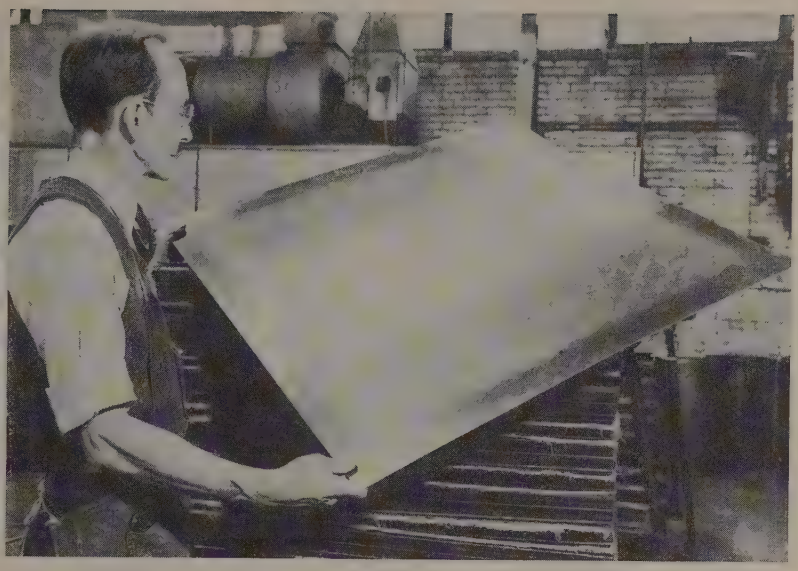
What Kind—Electrolytically deposited and rolled copper foil can be used for printed circuit applications. The electrolytically deposited foil is most often used in thicknesses of 0.00135 and 0.0027-in. Rolled copper foil (0.0015-in.) is also available. Rolled foil is not subject to porosity or pinholes. This makes it of special value in delicate circuits. Sheet size runs about 35½ by 37 in.

Bonding — The Permacel Tape Corp. produces an adhesive-copper foil combination for use in printed circuitry. By making the copper foil an integral part of its adhesive coated backing, a step is saved in bonding the final copper-clad laminate. It also markets a thermosetting adhesive film which is used with the build-up method of laminate, adhesive and copper foil. The Rubber & Asbesto Corp. is producing an adhesiv coated copper consisting of a electrolytic grade copper whic has been coated with high-pee strength, high-temperature-resis ant adhesive for bonding copper t rigid laminates based on phenolic epoxy or polyester resins.

The proper adhesive must b strong; have good heat resistanc to allow for soldering withou blistering; be resistant to shoc and moisture and at least matc the laminate in electrical prope ties. Problems involved: 1. Thermo plastic adhesives may blister du ing soldering operations and hav too much cold flow under norma operating conditions. Commo thermosetting adhesives do no possess the required shock resis ance and do not bond copper fo correctly. The solution: A mix ture of thermosetting and thermo plastic resins was develope (Armstrong Cork Co. uses a mix ture of phenolic and vinyl resins



e operator carefully aligns each pack fore applying pressure



Each foil-clad sheet is inspected for blistering, cracks or improper bonding after being removed from the laminating presses

me "laminators" manufacture eir own bond sheets.

Laminates—Synthane Corp. pro- ces them by impregnating or ating a filler material (paper, tton fabric or glass) with a ermosetting resin. A specified mber of layers are bonded to- ther by applying heat and pres- re. The chemical reaction trans- rms the layers into a light, yet rd, sheet which will not "de- minate" and cannot be softened further heat applications. These eets may be plated on one or th sides with copper foil.

Laminates other than phenolics, ch as melamine epoxy and sili- ne, may be used. Melamine sins are used where arc resist- ce is an important factor. Epoxy d silicone resins are called for nen heat resistance is of prime portance. Flame retardant ad- ives may be incorporated into ost of the thermosetting resins d these tend to increase the re- tance of the laminate to flame.

Assembly—There are two gen- al methods: 1. The adhesive is aced on the laminate with the pper foil on top. The build-up then placed under heat, 320°F, d pressure of some 1000 psi for hour. Adhesive film and copper l may be added to both sides of e build-up. 2. To meet closer ickness tolerances, the copper d laminate is produced by sand- ing a finished, cured sheet of lam- inate to the desired thickness, then adding the adhesive and copper foil. It is then returned to the press for an application of heat and pressure.

After bonding, copper-clad sheets are often sprayed with a strippable plastic film for protection against scratching, oxidation and scarring during trimming, packing and shipping.

Finished Sheet—To be used in printed circuitry, the finished copper-clad sheets must resist peeling, heat and moisture. The copper surface must be almost free of wrinkles, pits, nodules, scratches, pinholes and oxidized areas. Uniform thickness is a must and the copper must be relatively soft to retain proper punching characteristics.

Fabrication — Copper-clad laminates may be fabricated with the same machinery and methods used for sheets without the foil. Shearing and sawing create little problem. Special care must be taken in the design of progressive piercing and blanking dies, so that the stripper plate will prevent any lifting of the foil as punches are withdrawn. Drills should be sharpened with a negative rake. By doing this, the drill will not catch the foil and lift it away from the laminate, when holes are drilled through a narrow line of metal or at the terminations of a line. One problem which has no general solution is how to get rapid punching in exact register with the etched pattern.

Assembly of printed circuits into finished electronic or electrical devices is as varied as applications. One method: Punch or drill holes through the conductor and the laminate; insert leads of standard components in the holes; and solder the leads to the conductors. Dip soldering has been successful as an assembly technique for smaller units.

Future—Where an electrical device calls for miniaturization or increased lightness, printed circuitry may be a solution. As it becomes more generally used, the "board's" uniformity and strength will allow printed circuits to be used as subassembly plug - in replacement units. Low-power apparatus (television, radio, hearing aids, automatic signals, etc.) will use more printed circuits in the future. Designers are considering how smaller, inexpensive radios and vest-pocket tape recorders can be mass produced with the help of printed circuitry.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

SILENT HOIST KRANE KAR

"DOES JOB FASTER, SAVES US ONE MAN,"

says Jim Gull, Supt. Equip't., Gull Contracting Co., New Lincoln Tunnel Job, New York

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Write for illustrated Bulletin No. 79

**KRANE KAR Swing-Boom Mobile Crane available gas or diesel; adjustable telescopic boom; rubber tired; 5 sizes: 1½, 2½, 5, 10, 12½ ton cap.*

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Vacuu Brazin on Tri

BRAZING in a vacuum is mo toward the production line. P & Whitney vacuum brazes jet gine parts and assemblies bu keeping mum about results.

The National Advisory Cou on Aeronautics isn't so hesitan reports that vacuum brazes ar per cent better than dry hydr brazes. The furnace maker (St Machine, Philadelphia) claims in a high vacuum, free from ox ing gases, brazes are better cheaper than any produced in drogen, dissociated ammonia other special atmospheres.

Vacuum brazing takes a day a half for one cycle—which is parable to the time for hydr

h inner and outer shells are posi-
ned by vertical, tubular guides. The
er shell contains the heating ele-
nts

nosphere brazing. The furnace Pratt & Whitney can use any spe-l atmosphere, vacuum or even dinary air. Such multiple use dens the possibility of other pro-ction work to amortize the cost.

Production—Parts are prepared mounting them in a holding fix-re and wrapping the proper nount of brazing wire around ch joint. The fixture fits on the rnace base. Connections for acuating the furnace lead from e base to booster and fore pumps. Two bell-shaped covers—one on o of the other—fit around and er the base, forming the furnace. e outer, or top, cover contains e heating coils. The innermost ace contains the parts for braz-g and is evacuated to a pressure 0.05 micron or less. The space tween the inner and outer covers ke a double boiler) is partially acuated at the same time.

Water-cooled O-ring seals be-een the furnace base and the in-r and outer shells provide a tight al.

At 2150° F the brazing wire elts and infuses the joints. Com-red with air brazing results, peel sts show greater ductility. Shear sts indicate a strength of 63,000 i.

FREE-CUTTING

NOW LEADED!

Now you can obtain the advantages of leaded 52100 Steel in round bar stock. The presence of lead acts as a lubricant, resulting in freer machining, quicker, cleaner cutting, better finishes and longer tool life. All these advantages are conducive to greater production at reduced costs.

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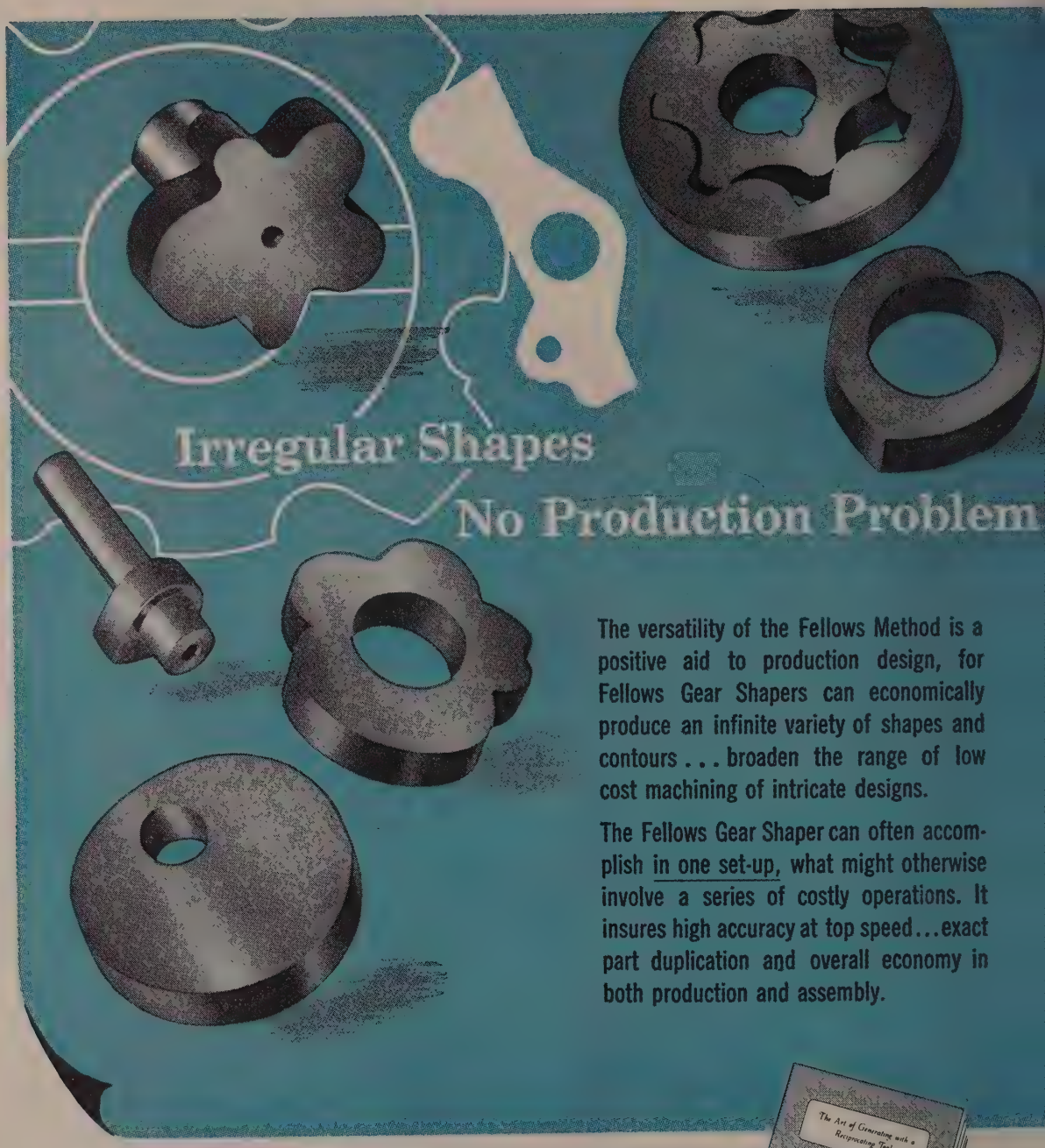
55-3

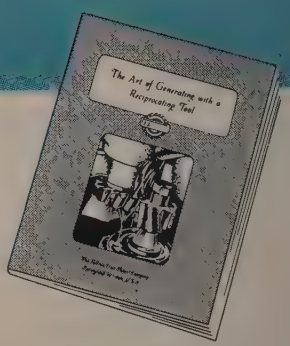
PETERSON STEELS, INC.
UNION, NEW JERSEY
Detroit, Michigan • Chicago, Illinois



Irregular Shapes No Production Problem

The versatility of the Fellows Method is a positive aid to production design, for Fellows Gear Shapers can economically produce an infinite variety of shapes and contours . . . broaden the range of low cost machining of intricate designs.

The Fellows Gear Shaper can often accomplish in one set-up, what might otherwise involve a series of costly operations. It insures high accuracy at top speed . . . exact part duplication and overall economy in both production and assembly.



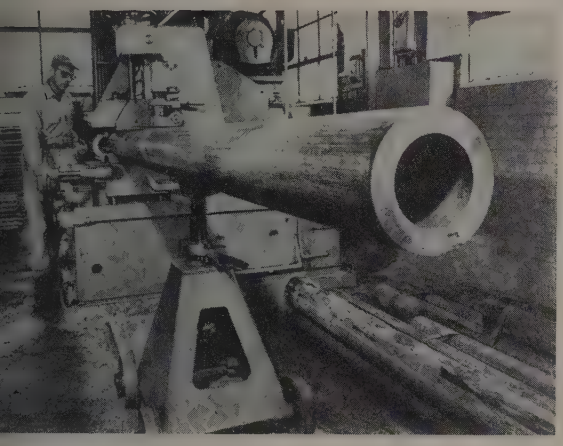
How the Fellows Method can be economically utilized for the production of many different shapes and parts is explained in "The Art of Generating with a Reciprocating Tool". A copy is yours for the asking!

THE Fellows GEAR SHAPER COMPANY

Head Office and Export Department: 78 River Street, Springfield, Vermont.

Branch Offices: 319 Fisher Bldg., Detroit 2 • 5835 West North Ave., Chicago 39 • 2206 Empire State Bldg., New Yo
6214 West Manchester Ave., Los Angeles 45

Continuous-Cast Bearing Bronzes Come in Larger Sizes



Bearing bronze is available in 44 new, larger sizes —from 5 to 9 in. in diameter. It comes in many foundry alloys and shapes up to 12 ft long.

The process: Molten metal, from an auxiliary melting furnace, is kept at the proper temperature in the casting crucible.

Solidification of the rod or tube takes place in a self-lubricating, water-cooled graphite die. Driving wheels, mounted underneath, withdraw the solidified product continuously at controlled speed.

A traveling saw, illustrated, is engaged at proper intervals to cut uniform lengths.

The gravity-feed, bottom-flow casting method prevents the trapping of dirt and dross. *Write*: Continuous-Cast Products Dept., American Smelting & Refining Co., Barber, N. J.

Front-to-Back Crankshaft Improves Press Design

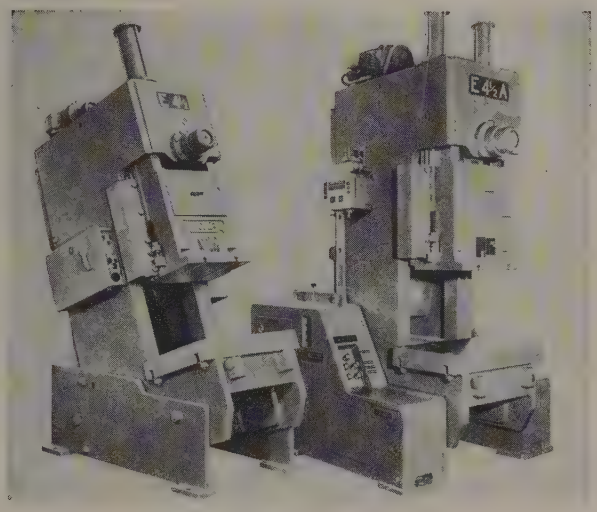
The new, open-back inclinable presses are built in ur sizes. Capacities are from 75 to 200 tons; shaft ameters range from 4½ to 7½-in.

Because the rugged front-to-back crankshaft does t require a narrow frame for support, the distance tween gibs has been increased. Result: A wider x-type slide contained within the gibbing gives full pport to wide dies and resists off-center loading the press.

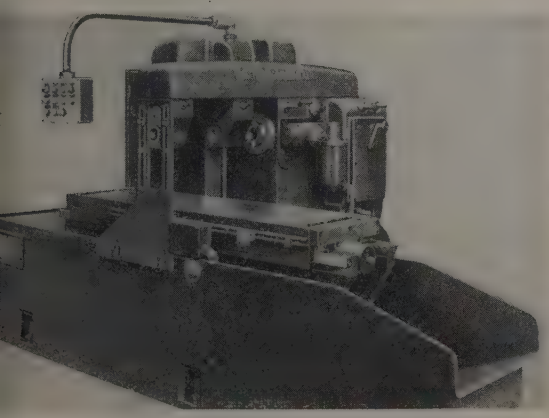
Die life is increased. Multiple V-gibs give efficient iding, improved bearing action and accurate align-ent of the slide. The tendency to cock is minimized.

An electropneumatic friction clutch operates directly the crankshaft. There are no gears or high speed aft to start and stop at each engagement.

The main gears are in sealed baths of oil. *Write*: agara Machine & Tool Works, 683 Northland Ave., ffalo 11, N. Y. *Phone*: Taylor 4070



Milling Machine Spindle Speeds Range from 25 to 1230 Rpm



Speeds and feeds of this bed-type milling machine provide fast cycles and high production.

Table feeds are 1 to 81 in. a minute. Rapid traverse of the table is 243 in. a minute. The spindle motor has 25 hp at 1800 rpm.

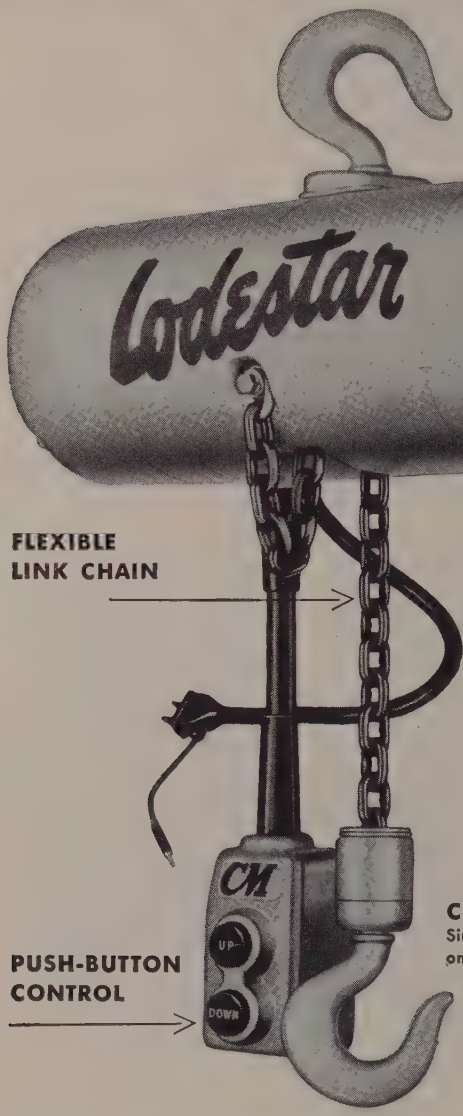
An involute spline on the spindle gives efficient power transmission regardless of quill position.

The quill diameter is 8¼-in.; its adjustment is 6 in. Even when fully extended, more quill remains in the housing than is extended.

The gear train is enclosed. Helical change gears give smooth and quiet power transmission. Gears are of heat treated alloy steel. *Write*: Machinery Mfg. Division, Motch & Merryweather Machinery Co., 888 E. 70th St., Cleveland 3, O. *Phone*: Utah 1-1515

CM Lodestar®

ENTIRELY NEW
differently NEW



FLEXIBLE LINK CHAIN

PUSH-BUTTON CONTROL

FEATURING:

- Push Button Control
- Self-Adjusting Heavy Duty Brake
- Sealed-in Lifetime Lubrication
- Overload Protection
- Full Enclosed Components
- Lowest Headroom
- "CM-Alloy" Flexible Link Chain

CAPACITIES: from ¼ to 1 ton. Single and 3 phase. ¼ ton model weighs only 51 pounds.

$149.50 and up

Built to serve you without costly maintenance

Lodestar is the first truly "heavy duty" version of the small electric hoist. The CM Lodestar is designed to operate without costly maintenance or interruptions in your work schedules. The initial cost is practically your only cost with a Lodestar... an extremely low cost indeed!

WRITE US or call your CM distributor for literature, prices and quick delivery from stock.

CHISHOLM-MOORE HOIST DIVISION
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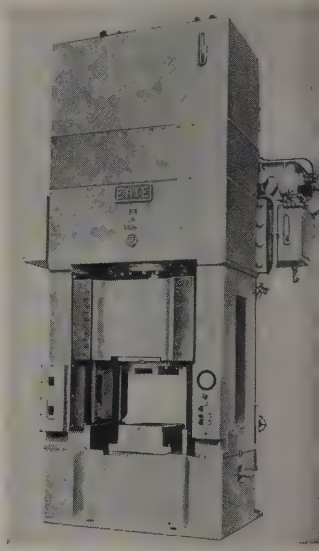
CM HOISTS AND CHAIN

NEW PRODUCTS and equipment

Hydraulic Forging Press

This 1000-ton capacity mach completes a 6-in. stroke cycle 4 seconds.

A special compression and compression feature combin speed control with automatic pr sure and precision reversal. to 1 guide ratio insures extre accuracy.

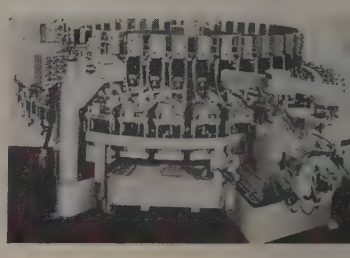


The press is of rigid side-ho ing construction with preshr tierods. It is self-contained can be arranged for semiautom single cycle or pushbutton ope tion. *Write*: Hydraulic Press vision, Erie Foundry Co., W. 1 St., Erie 6, Pa. *Phone*: 2-675

Brake Band Production

Two machines speed product of automatic transmission br bands. One provides constant forming and cutoff from coil st It makes perfect steel bands; radius is held constant at b ends.

The other machine, illustra



consumer acceptance hits new high

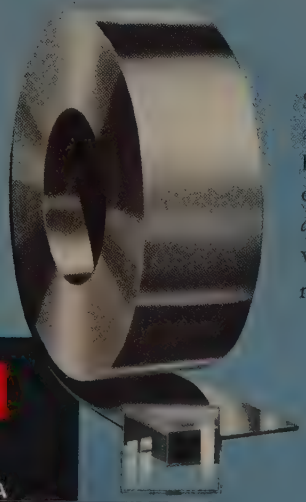
with cooking utensils fabricated from

SuVeneer® stainless Clad Metal

heats food fast!

washes so easily!

shine stays bright!



SuVeneer Stainless Clad Metal provides a low-carbon steel core for fast, even heating plus heavy stainless steel on each side for *the ever-bright beauty that cleans with a wipe.*

Write, phone or wire our Sales Department for complete information.

Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

6 OUT OF 10 ARE GRANODIZED

Six out of 10 cars in this lot at Standard Pressed Steel, Jenkintown, Penna., are Granodized with Granodine® before painting. Why do most automobile manufacturers use this crystalline zinc phosphate undercoating? The reasons are simple. Granodine provides a lasting bond between paint and steel. It forms an inert barrier against rust. It assures a fine and durable paint finish.

Automobile manufacturers depend upon Granodizing with Granodine, too, because of the technical assista offered by ACP. Not only do we supply the chemi — we also put them to work and, what's more, k them working effectively.

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CHEMICALS ACP PROCESSES

EW PRODUCTS and equipment

nds brake linings to steel bands ctrically with low voltage heat- elements. Rate: 360 an hour. is 42-station rotating machine s a ball bearing 6 ft in diameter provide stability and eliminate ration.

The machine will operate even one or more of its stations is ut down. *Write*: Distel Tool & achine Co., 2585 Beaufait, De- oit 7, Mich. *Phone*: Walnut 3071

ot Grinding

Slots up to ½-in. wide and 1 in. more deep can be ground by is machine.

Finished slots are ground to a rface finish of 5 microinches or ss. Total variations in flatness d parallelism between the op- sing faces of the slots are held less than 0.003-in.

A two-speed motor uses 12,000 m for roughing, 6000 fpm for ishing.

Coolant guarding is so arranged at grinding is done under water. his gives fine finish and accuracy ith relatively coarse, rubber- nded, cutoff wheels. *Write*: anet Products Corp., Cincinnati , O. *Phone*: Bramble 1-6000

eedle Thrust Bearings

Needle rollers, made of high car- on, chrome steel are through ardened to Rc 60 minimum. To ve even load distribution, the

A change for the better . . . at the Torrington Company, Torrington, Conn., now that the Stanley "Uni-Tie" Steel Strapping System is used to help pack many millions of needle rollers each month for shipment to the auto industry. Formerly, the needle rollers were put in canvas bags. Four to six of these bags were then packed in a wooden box.

Now the needle bearings are packed in vacuum-sealed cans. Twenty cans are placed in cartons and "Uni-Tied" with Stanley Steel Strapping to an expendable pallet.

The Stanley method of "Uni-Tieing" on pallets means fewer packs. Handling and packing material costs are reduced. Handling and storage are easier . . . faster. The package reinforcement supplied by Stanley Steel Strapping assures maximum in-transit protection.

Is a change in ***your*** packing procedure called for? The Stanley Steel Strapping Specialist will analyze your methods and suggest improvements. Is POWER PACKING ***your*** requirement? Stanley has a complete line of steel strapping power and hand tools.

Mail coupon for catalog and to arrange an on-the-spot demonstration.

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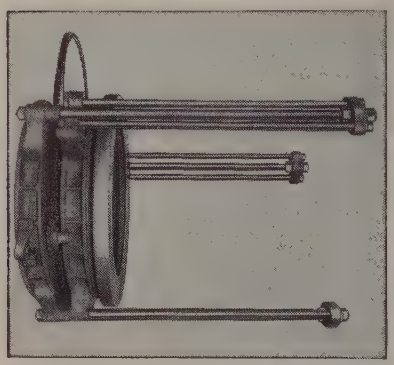
(Advertisement)

Gas Main Safety

Bailey Thermal Expansion Goggle Valves form tight, leak-proof seals to close mains from 36" to 120" in diameter

AN UNFAILING force of nature—the linear expansion and contraction of steel—is being used to increase steel mill safety. The larger sized gas mains are closed safely and efficiently by Bailey Thermal Expansion Goggle Valves. In them the powerful force exerted by the linear expansion of three steel tubes is used to free or clamp the goggle plate—providing an absolutely gas-tight seal.

In operation, steam is passed into the tubes, which are spaced evenly around and perpendicular to the rigid steel flanges of the valve. The resulting expansion frees the heavy goggle plate



Bailey Thermal Expansion Goggle Valves are produced in diameters from 36" to 120".

so it may be swung to the open or closed position. When the steam is shut off, contraction of the tubes takes place, closing the flanges tightly against the goggle plate. Since both sides of the plate are machined to conform to the machined edges of the valve flange, Bailey Valves are leak-proof in both open and closed positions.

Sound design and precision manufacture are combined in these valves to assure the ultimate in safety and reliability. They have been thoroughly proved on the gas mains of blast furnaces, gas washers and boiler plants. Bailey Thermal Expansion Goggle Valves are completely dependable in hot or cold, dirty or clean gas mains.

WILLIAM M. Bailey COMPANY

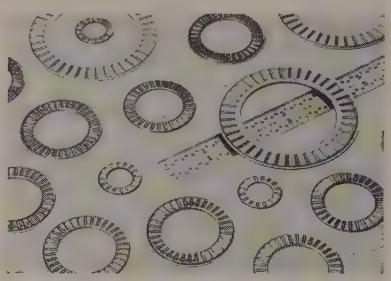
1221 Banksville Road

Pittsburgh 16, Pa.

NEW PRODUCTS and equipment

rollers are precision ground and lapped to a tolerance of 0.0002-in. on the diameter.

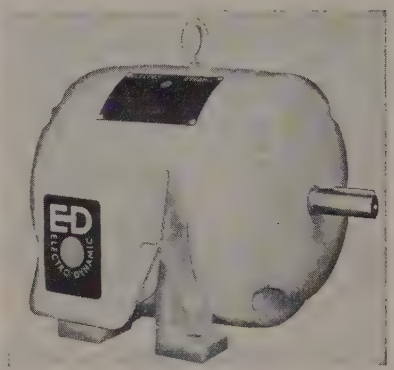
The thrust bearings come in four sizes: ½-in. bore x 15/16-in. OD; ¾ x 1¼-in.; 1 x 1 9/16-in.; and 1¼ x 1 15/16-in. The bores give a running fit on standard shafts.



The roller diameter (0.078-in.) is no thicker than an ordinary thrust washer. The bearing is easily adaptable in automatic transmissions. *Write*: Torrington Co., Torrington, Conn. *Phone*: Hunter 2-4441

Electric Motors

Improved features and performmance are engineered into a line of motors built to the new NEMA dimensions.



The line will extend to 40 hp, 3600 rpm. Motors are more compact than previous types and give the same horsepower in less space and with reduced weights.

A low air opening in the end bell protects the winding from liquids and abrasive dust.

The previous design of NEMA frames 203 through 586 is still available. *Write*: Electro Dynamic Division, General Dynamics Corp., Bayonne, N. J. *Phone*: Federal 9-0420

Strip Steel Inspection

A redesigned pinhole detec can spot holes 1 mm in diame in opaque strip 10 mm or l thick.

It operates at strip speeds 2000 fpm, and scans strips up 48-in. wide.

The light source is a single m cury lamp with a 25,000 ft-can output. The increased amount light gives a high sensitivity angular and vertical holes. *Wri* General Electric Co., Schenecta 5, N. Y. *Phone*: 4-2211

Aluminum Conductors

All overhead traveling cra made by this company now use verted-Y conductors. Sliding s collectors handle the heavy c rent.

The conductors are heavy alu num extrusions, available in 3 500, 1000 or more amperes.

Current collectors are built give long trouble-free service tough applications, such as in st mills and foundries.

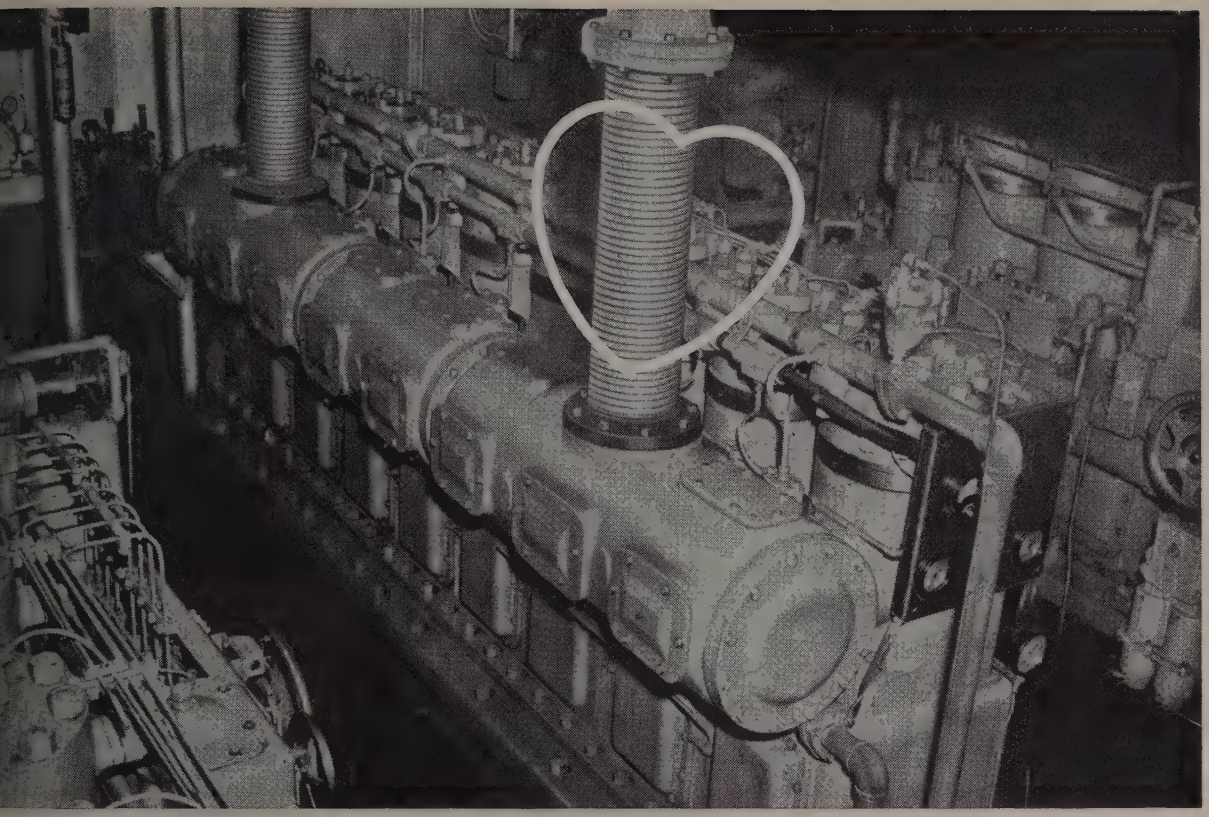
Installation is easy. *Wr* Cleveland Crane & Engineer Co., E. 289 St., Wickliffe, O. *Pho* Wickliffe 3-3700

Iron Powder Electrode

Improved Fleetweld 47 is electrode for high-speed welding mild steel in all positions. Eit direct or alternating current be used.

Powdered iron in the coat gives higher deposition rates. sult: 10 to 30 per cent hig welding speeds. The coating a produces greater footage per el trode.

Bead appearance is smooth clean. Spatter is minimum. arc is smooth, soft and stable



GIVES HORSEPOWER THE *P-U-R-R* OF A KITTEN

Flexible tubing reduces Diesel vibrations... Absorbs thermal expansion

Ever been around while a smoothly-running Diesel warmed up . . . and then, in a few minutes, began a series of vibrations? It's a condition often traced to the type of piping used on air intake and exhaust lines.

Such vibrations can be prevented . . . or cured . . . with Penflex four-wall interlocked tubing, which is flexible enough to absorb the vibration . . . tight enough to prevent any leakage of air and gases. It has other important features, too . . . it "gives"—instead of breaking with thermal expansion.

Afloat or ashore, Penflex tubing finds many applications on Diesel engines . . . on exhausts and air intakes . . . fuel oil and starting air lines . . . lubricating oil and water circulating lines . . . as a partial listing.

Penflex makes a complete line of four-wall, interlocking and seamless welded corrugated tubing, including braided-wire or rubber covered types . . . ⅛" to 24" I.D., in materials suited to various conditions.

"Flexineering," the science of selecting the tubing of the right size, weight, type and construction for these numerous applications, will be explained to you by Penflex engineers. Or you will find our "Flexineering" booklet both helpful and interesting. Send for your copy today.

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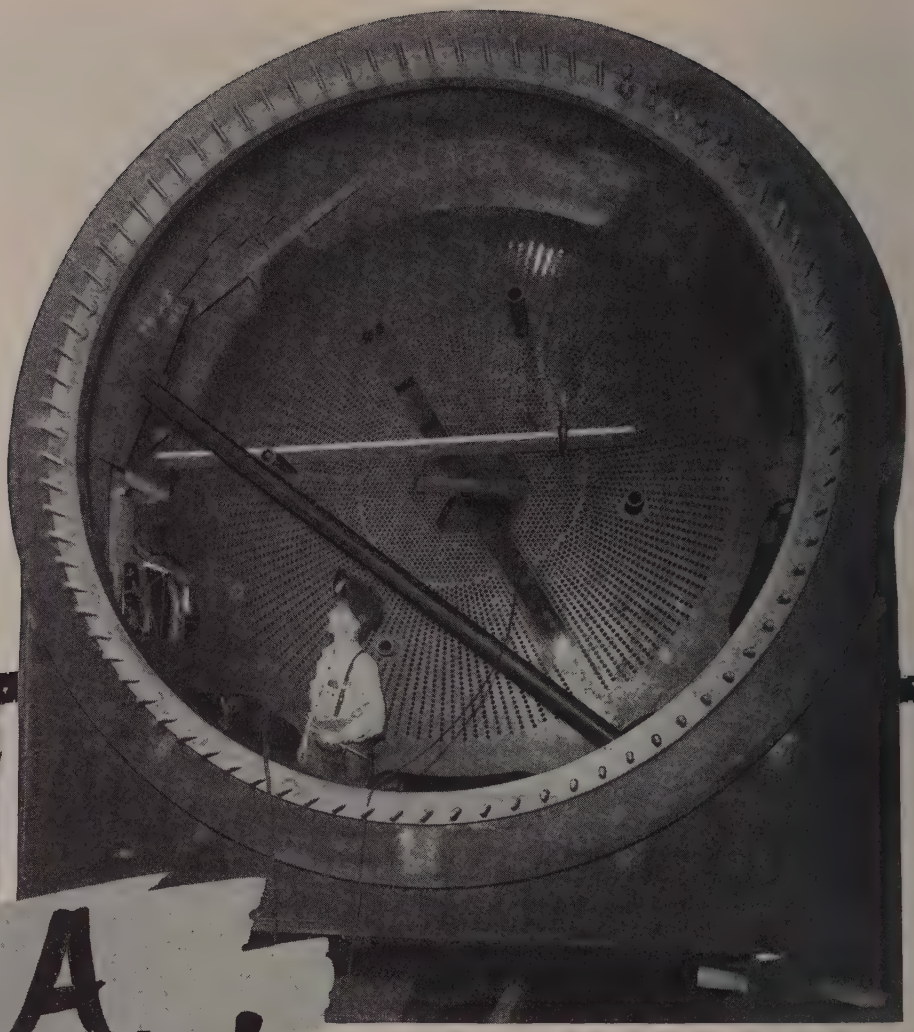

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It pays to place big jobs in the hands of responsible people. In our plant there are proper facilities to build large pieces of industrial equipment.

The job can be completed without lost time and inefficiency caused by subletting parts. Sun Ship can do the job from beginning to end. Plate work, forge work, structural shape bending, stress relieving, X-raying, machining.

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l positions and has no tendency stick. Either the drag or short- c technique can be used.

Electrode sizes are from ⅛ to 16-in. in diameter. *Write*: Lin- ln Electric Co., 22801 St. Clair ve., Cleveland 17, O. *Phone*: anhoe 1-8100

lug Gages

Tungsten carbide plug gages are id to have an accurate life up 50 times greater than other ges.

Fewer scrap parts result be- use it is not necessary to add oversize tolerance to "go" mem- rs.

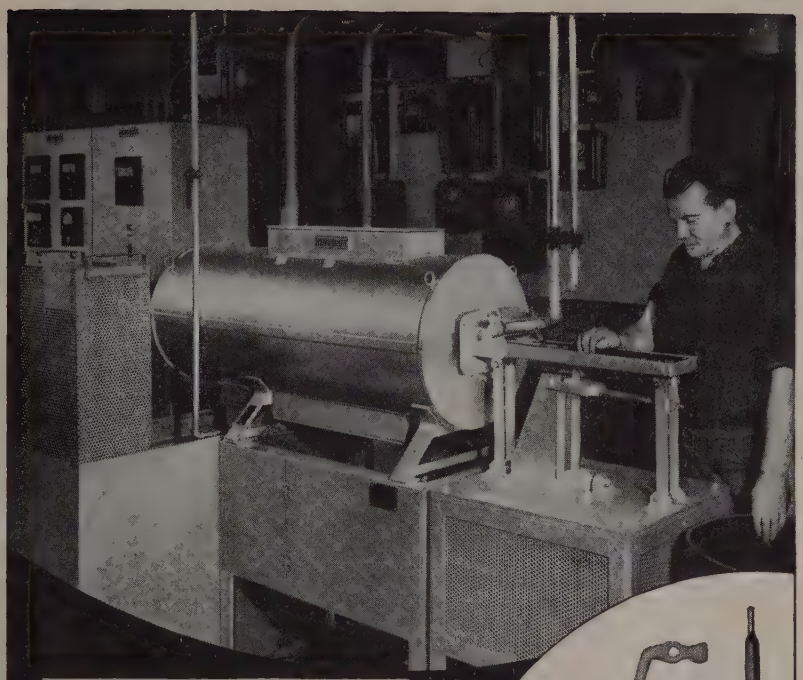
The tungsten carbide resists cor- sion. It is nonmagnetic, not apt pick up foreign materials and ar the work.

Gage sizes range from 0.025 to 010-in. *Write*: Regal Division, eloit Tool Corp., Beloit, Wis. *hone*: Emerson 5-8878

ir Press

Increased vertical height, throat pth and ram stroke are provided this double-acting air press.

Air cylinders support unlimited per die weights and permit ster operating cycles. The ram



HEVI DUTY®

Shaker Hearth FURNACES

This furnace used to Carburize, Dry Cyanide or Bright Harden these parts.

Save Time . . . Money . . . Material!

Check these operations:

- Hardening small lock spring formerly took two days, now only 75 minutes. Rejects were 30%, now less than 1%.
- $12,000 saved the first year at a large electric applicance manufacturer; almost three times the original cost of the furnace.
- Cleaning and pickling eliminated because of "Bright" case hardening at a business machine manufacturer.
- Heat treating costs cut in half at a chain manufacturer due to the ease of operation.
- Stainless steel springs "Bright" hardened without distortion because the parts are individually heated in a protective atmosphere and then are dropped directly into the oil quench.

Learn more about this modern production tool and the way it can help you. Write for Bulletin HD 850.

HEVI DUTY ELECTRIC COMPANY

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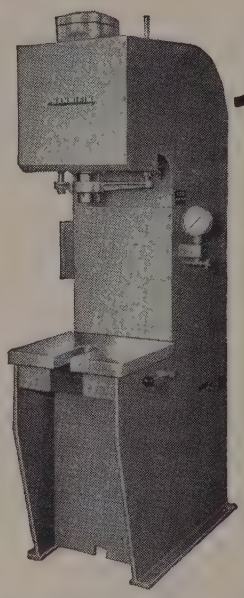
Heat Treating Furnaces... Electric Exclusively

Dry Type Transformers *Constant Current Regulators*

PRICE LIST

ON HANNIFIN STOCK HYDRAULIC PRESSES



1-TON	$ 552
2-TON	$ 627
5-TON	$1,286
8-TON	$1,581
10-TON	$1,855
25-TON	$3,681

Prices complete with motors and starters F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

DELIVERY FROM STOCK

Demand for these popular presses is so consistent we are able to produce them in quantity and pass the savings along to you.

Construction-wise and quality-wise these small general-purpose presses are identical to the larger Hannifin presses, up to 150 tons. Special, optional controls when needed.

WRITE for complete information on the Hannifin Hydraulic Press you're interested in.

HANNIFIN

HANNIFIN CORPORATION, 523 S. WOLF ROAD, DES PLAINES, ILLINOIS

Haul Castings the Economical Sterling Way!

These all-steel, heavy duty trucks come in handy for hauling castings to and from cleaning room. With roller bearing wheels and ball bearing swivel casters, they glide along smoothly, maneuver easily. Save both time and labor. Capacity 2,000 lbs. Sturdy, reinforced welded construction. Write for literature.

STERLING WHEELBARROW CO., • Milwaukee 14, Wis., U.S.A.

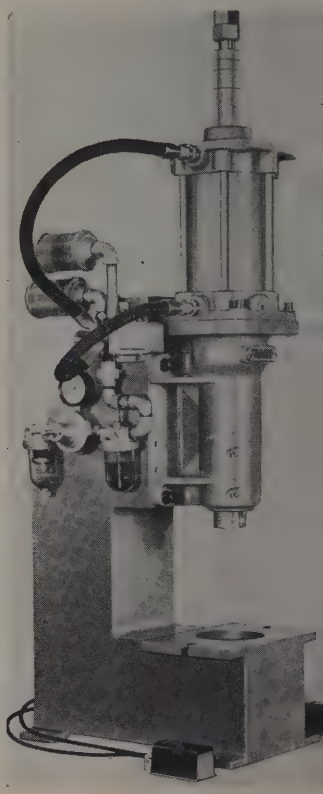
Sterling

FOUNDRY EQUIPMENT

A 8530-1⅓

is supported and guided indepe
ently of the cylinder piston
and is keyed to prevent turni

A hole through the platen
provided for operations need
punch slug or workpiece clearar



Standard equipment includes
bricator, filter, regulator, regu
ing gage and two mufflers. *Wr*
Famco Machine Co., 3100 Sh
dan Rd., Kenosha, Wis. *Pho*
Olympic 4-3516

Fatigue Testing

Here is a constant force
chine for multirange fatigue t
ing. Various models have cap
ties from 200 to 120,000 lb.

The multirange feature has
test stations. One is for h

"We always had them cast;

ut we found Harvey Aluminum

forgings made better pistons"

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force; the other is for high amplitude operation.

A torque bar provides for high amplitude and permits the machine to be used with heavy test pieces and fixtures. Errors from temperature changes are eliminated.

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The entire unit is seismically mounted. *Write*: Ivy Co., Norwalk, Conn. *Phone*: Temple 8-5528

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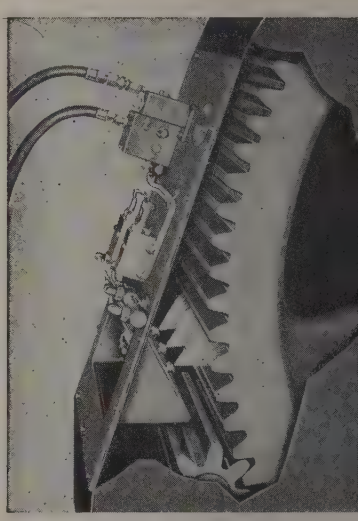
Here is a solution to the problem of sealing drilled holes.

The cylindrical pin plug is expanded mechanically after it is inserted. This is done by a pin which goes into a tapered, ream hole in the center of the pin plu

The result is an interference of 0.0020-in. Small grooves on t outside diameter of the pin pl each form their own seal and taining ring. *Write*: Lee C Wesley Ave., Westbrook, Conn.

Spray Panel Lubrication

Bull, girth, spur and herrin bone gears are spray lubricated this self-contained panel. T panel is fastened to gear housin or framework and sprays the bricant directly to the pressu side of the gear teeth.



The panels are about 2 x 3 ft a have stainless steel spray valv with built-in nozzles. Measuri valves distribute the lubricant u der pressure to the spray valv where it is mixed with air to fo a penetrating spray. *Write*: Farv Corp., 3249 E. 80th St., Clevela 4, O. *Phone*: Vulcan 3-4560

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The trucks have dual pow plants, with separate drive moto and reduction units for each pa of drive wheels. Drive motors a inside the frame. Narrow desi permits operation in confin areas.

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NEW literature

Write directly to the company for a copy

Materials Handling

Here are data on balance-type trucks for trailer-train use, two-wheeled trucks and platform trucks —bulletin 56G, 12 pages. Nutting Truck & Caster Co., 1201 W. Division St., Faribault, Minn.

Metal Forming

This illustrated booklet explains the principles of forming metal parts by expanding, shrinking and roll forming—20 pages. Dept. 88-1 Grotnes Machine Works, 5454 N. Wolcott Ave., Chicago 40, Ill.

Arc Welding

Carbon-dioxide shielded welding with consumable electrodes is described—12 pages. Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y.

Controls

Hand switches, a foot switch, limit switches, control boxes and clutch actuating equipment are covered—catalog 65, 12 pages. Micro Switch Division, Minneapolis-Honeywell Regulator Co., Freeport, Ill.

Dial Gages

Dial indicator gages for checking all types of dimensional conditions are shown—48 pages. Low friction dial indicators are pictured — 24 pages. Federal Products Corp., 1144 Eddy St., Providence 1, R. I.

Powdered Brass

The chemical and physical properties of powdered brass alloys are charted—1 page. Dixon Sintaloy Inc., subsidiary of Joseph Dixon Crucible Co., 535 Hope St., Stamford, Conn.

Platform Truck

An electric high-lift truck for use in cramped areas is described—bulletin 551-3, 4 pages. Barrett-Cravens Co., 630 Dundee Rd., Northbrook, Ill.

Stainless Steel

This data sheet gives the mechanical properties of chromium-nickel-molybdenum stainless steel types 316, 316L, 317 and 317L. Sales Dept., Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.

Furnace Equipment

Here is information on muffles, furnace trays and fixtures, retorts and pit-type furnace equipment, salt bath equipment, pickling and plating equipment made of heat and cor-

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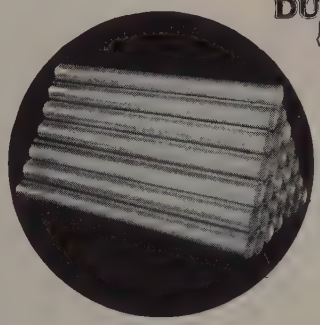

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NEW LITERATURE

rosion resistant alloys—catalog G-
32 pages. Rolock Inc., 1350 Kin
Highway, Fairfield, Conn.

Plastics and Resins

With this reference file you c
check on the properties of plast
and resins and their ability to
formed or processed—12 pages. Bak
lite Co., division of Union Carbide
Carbon Corp., 300 Madison Ave., N
York 17, N. Y.

Radiant Heat Ovens

This folder tells how to build
frared ovens for heating, baking
drying. Engineered radiant oven co
ponents are used. Fostoria Press
Steel Co., Fostoria, O.

Inclinable Presses

Both standard and enclosed press
(from 10 to 200 tons) are describ
—catalog 2D, 32 pages. E. W. Bli
Co., Canton, O.

Flexible Couplings

Case histories show the solution
power transmission problems—
pages. American Flexible Couplin
Co., 1801 Pittsburgh Ave., Erie 1, P

Colloidal Dispersions

Colloidal graphite and molybdenu
disulphide cut costs in forging, wi
drawing, extrusion, piercing, punc
ing, spinning, cutting and other me
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bulletin 426, 4 pages. Acheson Co
loids Co., unit of Acheson Industri
Inc., Port Huron, Mich.

Dynamic Balancing

Here is information on balancin
rotating parts weighing from 4
to 8 tons. Bear Mfg. Co., Rock Islan
Ill.

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Here's how light waves are us
to control the accuracy of gage bloc
—44 pages. Engis Equipment Co., 4
S. Dearborn St., Chicago 5, Ill.

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Straight-side presses with capac
ties from 200 to 2000 tons are d
picted—catalog D, 28 pages. Dan
Machine Specialties Inc., 4358
Roosevelt Rd., Chicago 50, Ill.

Cast Iron Alloys

Recommended uses of Vancora
alloys in iron foundries are give
Vanadium Corp. of America, 420 Le
ington Ave., New York 17, N. Y.

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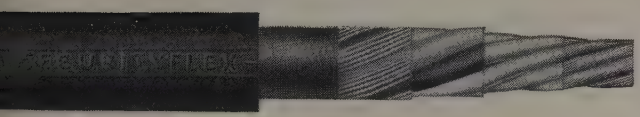

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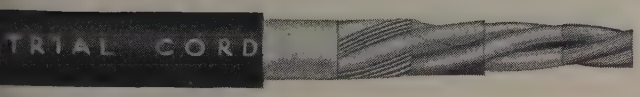

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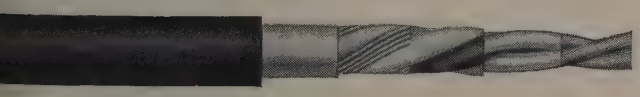

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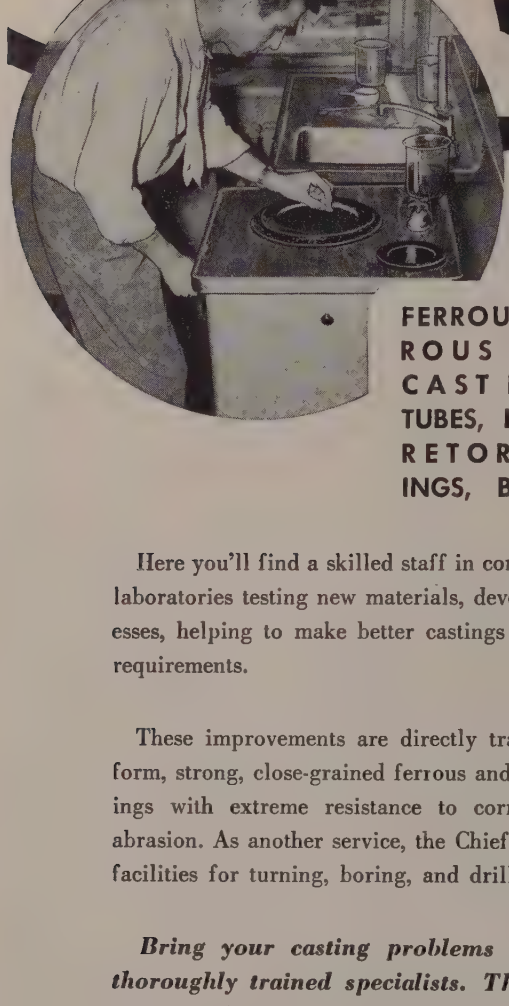

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Bring your casting problems to the Chief's thoroughly trained specialists. These men are always available to apply their broad experience to your particular needs.

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All types of grinding wheels
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Abrasive & Metal Products Co.,
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Super refractories for nonferr
melting furnaces are described
pages. Refractories Division, Car
rundum Co., Perth Amboy, N. J.

Work-Holding Tools

Catalog 9155 (10 pages) has inf
mation on vises for angle machini
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ers. Universal Vise & Tool Co., P
ma, Mich.

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Eighth St., Los Angeles 21, Calif

Die Springs

Tool and die makers now can
lect springs to suit the press
needed—bulletin 72, 10 pages.
Supply Division, E. W. Bliss
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Carbon dioxide, dry chemical, foa
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Kidde & Co. Inc., Belleville 9, N.

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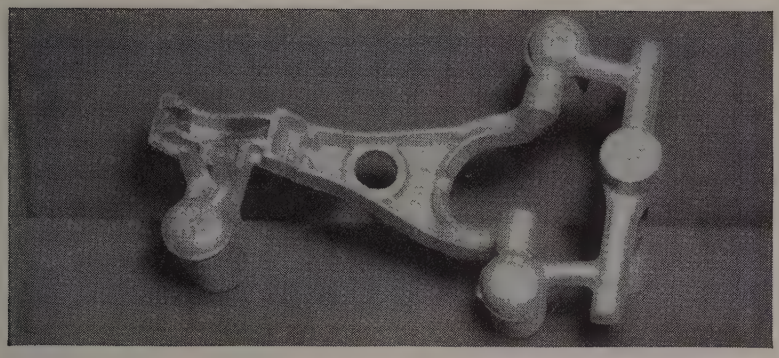
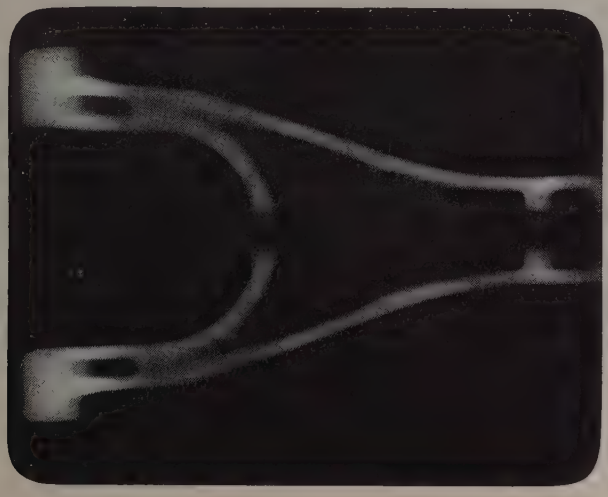
Shrink steals strength — and profits



— RADIOGRAPHY points the way to avoid it



IS steel fork lever was designed ake a specific load. Would it up? Not if shrinkage had ed its strength.

t here is where radiography in with double-barreled effect. the radiographs which were e showed the foundryman that internal shrinkage was present. Then the radiographs disclosed a recurring pattern of these defects, thus suggesting a change in molding which greatly reduced the difficulty.

This is typical of the ways radiography helps the foundryman make sure only satisfactory work is delivered and so builds a reputation for high-quality castings.

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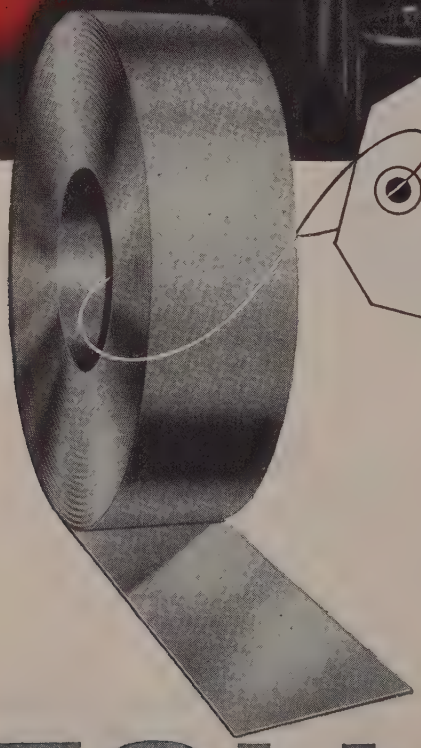

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STEEL

December 5, 1955

Market Outlook

A YEAR of capacity operations for the steel industry is rapidly shaping up for 1956.

You can see that by the way customers are lining up business for next year. Some of the leading fabricators of structural shapes are booked nine and ten months ahead. Railroads continue to order freight cars. Order plans for the final two months of 1955 total 87,500 cars —more than double this year's output and far above the 57,000 cars on order Nov. 1. Production in 1955 is expected to total 37,500 cars.

GETTING IN LINE—Oil well drillers are attempting already to line up their midsummer steel requirements. Not only do they expect their needs to be high but they anticipate strong competition for steel.

Farm equipment makers view 1956 prospects with enthusiasm. Their plans include increased output of their lines and more aggressive selling.

UNFINISHED BUSINESS—Further assurance of full order books for the steel producers is a substantial carry-over of orders from 1955—the range is from one to two months of orders, depending on the product and the producer.

Carry-overs stem not from a lack of production by the steel industry but from a flood of demand. Nearly all of this year, steel production has been above 90 per cent of capacity. It hit a new high for this year by edging up to 100 per cent of capacity in the week ended Dec. 4. In the preceding three weeks, the rate had been 99 per cent. Although the industry operated at more than 100 per cent in previous years, it never turned out more steel than it did in the week ended Dec. 4: The industry has a larger capacity than ever before. A 100-per-cent rate now yields 2,413,278 net tons of raw steel.

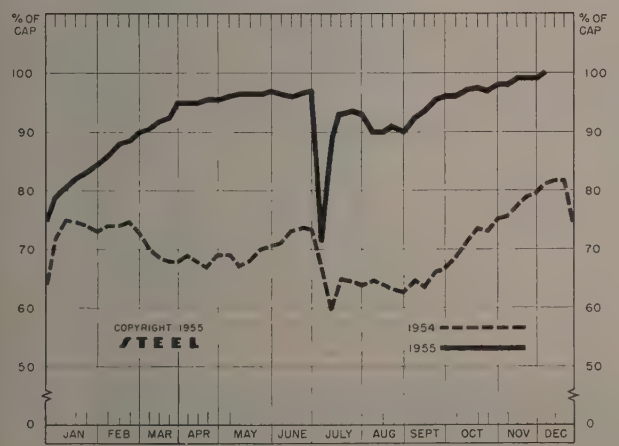
GROWTH INDUSTRY—Heavy current demand for steel and projected growth of future demand continue to bring out plans for steel plant expansions. Alan Wood Steel Co., Conshohocken, Pa., announced it will boost its annual ingot capacity from 625,000 to 800,000 tons.

PRICES RISE—Costs continue to push up steel prices. Connors Steel Division of the H. K. Porter Company Inc. made an across-the-board increase of a half a cent a pound ($10 a ton) in the base price of its products. The Birmingham producer makes carbon structural shapes, hot-rolled carbon strip, carbon steel merchant bars and reinforcing bars. Lukens Steel Co., Coatesville, Pa., advanced base prices of its Monel-clad steel plate. Increases include $32 a ton on 10-per-cent Monel cladding and $64 a ton on 20 per cent. American Steel & Wire Division, U. S. Steel Corp., increased base prices on spring steel strips and revised extras on cold-rolled carbon strip. U. S. Steel Corp.'s Columbia-Geneva Steel Division and Tennessee Coal & Iron Division revised extras on sheet and strip.

BLAMES GOVERNMENT—Connors, a producer of electric furnace steel, blames its price increases on the federal government's policy of allowing heavy exports of steel scrap—a steelmaking material.

Scrap prices continued their rise and shoved STEEL's composite on steelmaking grades to $47.00 a gross ton, a 67-cent rise over the preceding week.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Dec. 4	Change	Same Week 1954	Same Week 1953
Pittsburgh	102.5	— 1*	78.5	77.5
Chicago	99	+ 0.5*	91	97
Mid-Atlantic	99	+ 1	72	90
Youngstown	100	0	86	90
Wheeling	102	+ 1	90.5	91
Cleveland	96	— 2*	89.5	93
Buffalo	80	—25	100	100
Birmingham	94	0	64	96.5
New England	88	— 2	70	77
Cincinnati	92.5	0	71.5	71.5
St. Louis	101.5	— 8	83	84.5
Detroit	100.5	+ 5.5	80	101
Western	103	+ 4	84	90
National Rate	100	+ 1	81	87

INGOT PRODUCTION‡

	Week Ended Dec. 4	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	149.0†	150.4	149.4	120.8
NET TONS (In thousands)	2,394†	2,416	2,400	1,941

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

Metalworking Outlook—p. 75

Technical Outlook—p. 121

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Nov. 29 1955	Nov. 22 1955	Month Ago	Nov. Average
(1947-1949=100)	154.6	154.6	154.5	154.5

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 29

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parenthesis. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.200
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	7.993
Tie Plates	5.625	Strip, C.R., Stainless, 403 (lb)	0.444
Axles, Railway	8.000	Strip, H.R., Carbon	5.406
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.366
Plates, Carbon	4.950	Pipe, Galv., Buttweld (100 ft)	19.971
Structural Shapes	4.867	Pipe, Line (100 ft)	158.925
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	39.470
Bars, Tool Steel, H.R. Alloy, High Speed W-18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon	20.980
Bars, H.R., Alloy	9.375	Tubing, Mechanical, Stainless, 304 (100 ft)	178.897
Bars, H.R., Stainless, 303 (lb)	0.450	Tin Plate, Hot-dipped, 1.25 lb	8.933
Bars, H.R., Carbon	5.350	Tin Plate, Electrolytic, 0.25 lb	7.633
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	6.733
Bars, C.F., Carbon	8.660	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.175	Wire, Drawn, Stainless 430 (lb)	0.578
Bars, C.F., Stainless, 302 (lb)	0.468	Bale ties (bundle)	6.473
Sheets, H.R. Carbon	5.145	Nails, Wire, 8d Common	8.618
Sheets, C.R., Carbon	6.239	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.690	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	Nov. 30 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	208.90	208.90	208.90	194.53	157.76
Index in cents per lb	5.659	5.659	5.659	5.270	4.274

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$128.14	$128.14	$128.14	$117.95	$95.09
No. 2 Fdry, Pig Iron, GT	58.99	58.99	58.99	56.54	49.54
Basic Pig Iron, GT	58.49	58.49	58.49	56.04	49.04
Malleable Pig Iron, GT	59.77	59.77	59.77	57.27	50.27
Steelmaking Scrap, GT	47.00	46.33	45.17	32.58	41.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as wise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 30 1955	Week Ago	Month Ago	Year Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30
Bars, H.R., Chicago	4.65	4.65	4.65	4.30
Bars, H.R., deld. Philadelphia	4.90	4.90	4.90	4.55
Bars, C.F., Pittsburgh	5.90	5.90	5.90	5.40
Shapes Std., Pittsburgh	4.60	4.60	4.60	4.25
Shapes, Std., Chicago	4.60	4.60	4.60	4.25
Shapes, deld., Philadelphia	4.88	4.88	4.88	4.53
Plates, Pittsburgh	4.50	4.50	4.50	4.225
Plates, Chicago	4.50	4.50	4.50	4.225
Plates, Coatesville, Pa.	4.80	4.80	4.80	4.225
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225
Plates, Claymont, Del.	4.80	4.80	4.80	4.225
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95
Sheets, C.R., Detriot	5.325-5.425	5.325-5.425	5.325-5.425	5.10
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05
Strip, H.R., Chicago	4.325	4.325	4.325	4.05
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75
Strip, C.R., Chicago	6.35	6.35	6.35	5.85
Strip, C.R., Detroit	6.35	6.35	6.35	5.90
Wire, Basic, Pittsburgh	6.25	6.25	6.25	5.75
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85
Tin plate (1.50 lb), box, Pitts.	$9.45	$9.45	$9.45	$9.05
SEMIFINISHED STEEL				
Billets, Forging, Pitts (NT)	$84.50	$84.50	$84.50	$78.00
Wire rods, ⅜-⅝" Pitts.	5.025	5.025	5.025	4.675
PIG IRON, Gross Ton				
Bessemer, Pitts.	$59.50	$59.50	$59.50	$57.00
Basic, Valley	58.50	58.50	58.50	56.00
Basic, deld. Phila.	62.16	62.16	62.16	59.66
No. 2 Fdry, Pitts.	59.00	59.00	59.00	56.50
No. 2 Fdry, Chicago	59.00	59.00	59.00	56.50
No. 2 Fdry, Valley	59.00	59.00	59.00	56.50
No. 2 Fdry, deld. Phila.	62.66	62.66	62.66	60.16
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.58
Malleable, Valley	59.00	59.00	59.00	56.50
Malleable, Chicago	59.00	59.00	59.00	56.50
Ferromanganese, Duquesne.	190.00†	190.00†	190.00†	190.00†

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$46.50	$45.50	$44.50	$32.50
No. 1 Heavy Melt, E. Pa.	48.00	48.00	46.50	32.25
No. 1 Heavy Melt, Chicago	46.50	45.50	44.50	33.00
No. 1 Heavy Melt, Valley	52.50	48.00	48.00	34.50
No. 1 Heavy Melt, Cleve.	49.50	45.50	45.50	32.50
No. 1 Heavy Melt, Buffalo	43.50	43.50	43.50	30.50
Rails, Rerolling, Chicago	69.50	66.50	65.50	52.50
No. 1 Cast, Chicago	49.50	48.50	47.50	39.50
COKE, Net Ton				
Beehive, Furn, Connlsvl.	$13.625	$13.625	$13.625	$13.75
Beehive, Fdry, Connlsvl.	16.50	16.50	16.50	16.75
Oven, Fdry, Chicago	25.75	25.75	25.75	24.50

Daily Nonferrous Price Record

	Price Nov. 30	Last Change	Previous Price	Oct. Avg.	Sept. Avg.	Nov. 1954 Avg.
Copper	43.00–47.00	Nov. 28, 1955	43.00–46.50	44.594	45.380	30.000
Lead	15.30	Sept. 26, 1955	14.80	15.300	14.920	14.800
Zinc	13.00	Oct. 21, 1955	13.00–13.50	13.020	12.940	11.500
Tin	100.25	Nov. 29, 1955	99.625	96.230	96.565	91.196
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	60.000
Aluminum	24.40	Aug. 8, 1955	23.20–24.40	24.400	24.400	22.200
Magnesium	32.50	Aug. 16, 1955	28.50	32.500	32.500	27.000

Quotations in cents per pound ba
COPPER, deld. Conn. Valley; LEA
mon grade, deld. St. Louis,
prime western, E. St. Louis
Straits, deld, New York; NICKE
trolytic cathodes, 99.9%, base
refinery, unpacked; ALUMINUM,
ingots, 99 + %, deld.; MAG
99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of p
  spread between various forms of steel. You can get
  base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situa
  of materials, including iron and steel, nonferrous me
  and scrap. Other articles analyze special situations of
  terest and importance to you.
- **Reports on iron and steel production, and materials and p**
  uct shipments.

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189

THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN

Nonferrous Metals

Next year should see marked improvement in nickel supply as the government continues to divert from stockpile and military requirements drop

Nonferrous Metal Prices, Pages 178 & 179

IT'S ALMOST certain that the nickel shortage would be over if the government stopped stockpiling. In fact, there could be a surplus and a price reduction.

But—The government has no such intention. One thing is apparent. As more production facilities come in and stockpile objectives come closer to being realized, the government may become more lenient. This year is a case in point. Some 24 million lb have been diverted from stockpile to the military and civilian markets. Civilian relief has been slight because military requirements have jumped. But it is an initial step.

How much nickel is used for military applications is top secret, but it is estimated that about 40 per cent of all nickel produced is needed to meet world-wide military requirements.

Rundown—The estimated supply of nickel for the U. S. this year is about 300 million lb. The world supply will come in at about 400 million lb. Combined consumption by the U. S. military (including the Atomic Energy Commission) and civilian industry will reach 225 to 230 million lb. The rest goes to stockpile.

Forward Look—Revival of controls is out of question. The government will not take the responsibility, or the headaches, involved. Primary producers will continue to juggle supply, giving everyone a proportional share.

Each year is going to see progress toward equalization of supply and demand. While stockpile contracts extend through 1962, it is conceivable that by 1958 the government will be telling primary producers: "See if you can sell it. If you can't, we will take it." This could happen in small degree from now on.

What about the price of nickel? On the gray market it is bringing as much as $2.50 a pound. Japanese and French nickel, which is not finding its way into the gray market, is still expensive. But most experts are quick to point out that the current market price (about 64½-cents a pound) is in the area where this primary metal has been sold and developed through the years. This, they feel, is the best barometer for the future.

Help Coming—There is a growing feeling that the military take is too high. Reason: There may be a basic misunderstanding of regulations pertaining to the right of certification. The Business & Defense Services Administration is conducting a survey to discover what abuses, if any, are taking place. Outlook: With various government agencies keeping a closer watch, military requirements should drop during the coming year.

Meanwhile, there is some move toward finding substitutes. While this is causing primary producers concern, it is felt that nickel will be reinstated in most cases as soon as there is enough to go around.

Crux for '56: If the government continues to divert nickel and military demands are reduced, the coming year could see supply nearly catch up with demand.

Tin Faces Decisions

Demand and supply in the tin market are so close that minor situations, such as a breakdown in Nigerian wage negotiations, or temporarily low stocks in the United Kingdom, are having immediate repercussion on tin prices.

While the price hovers near 99 cents a pound, other important questions will have to be solved during the early part of next year. One big question: What is to become of the U. S. Facilities Corp.'s Texas City smelter? At this stage, it is a white elephant because it takes Cong sional approval before a company purchase it. No one is going to going out to find an ore supply fore he knows that it is possibl own the smelter. And without ar sured ore supply, no one is goin be interested in buying. There growing feeling that the best tion is to sell the installation an low the purchaser to use it for purpose.

The tin market is tight at the ment, but someone will have to the problem of where some 2 tons of tin are going to be use has been going into stockpile.

Outlook for '56: Consumption be at high levels, but prices edge downward rather than up (see table) as a surplus appears.

Tin Prices Edge Up

(average price in cents per lb)

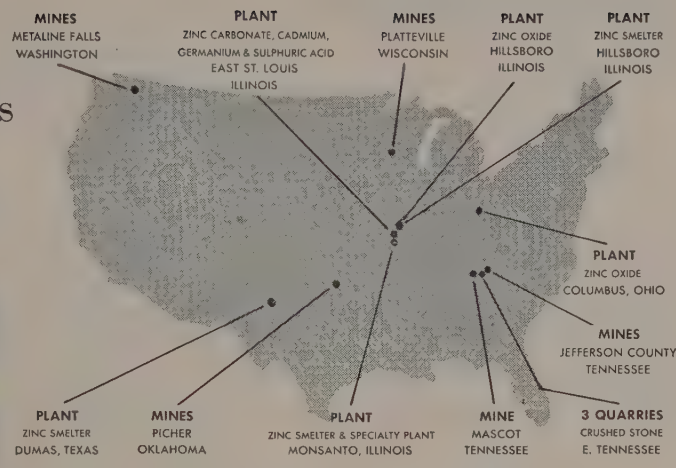
November*	97.784
October	96.230
September	96.565
August	96.519
July	97.045
June	93.668
May	91.410
April	91.458
March	91.176
February	90.908
January	87.280

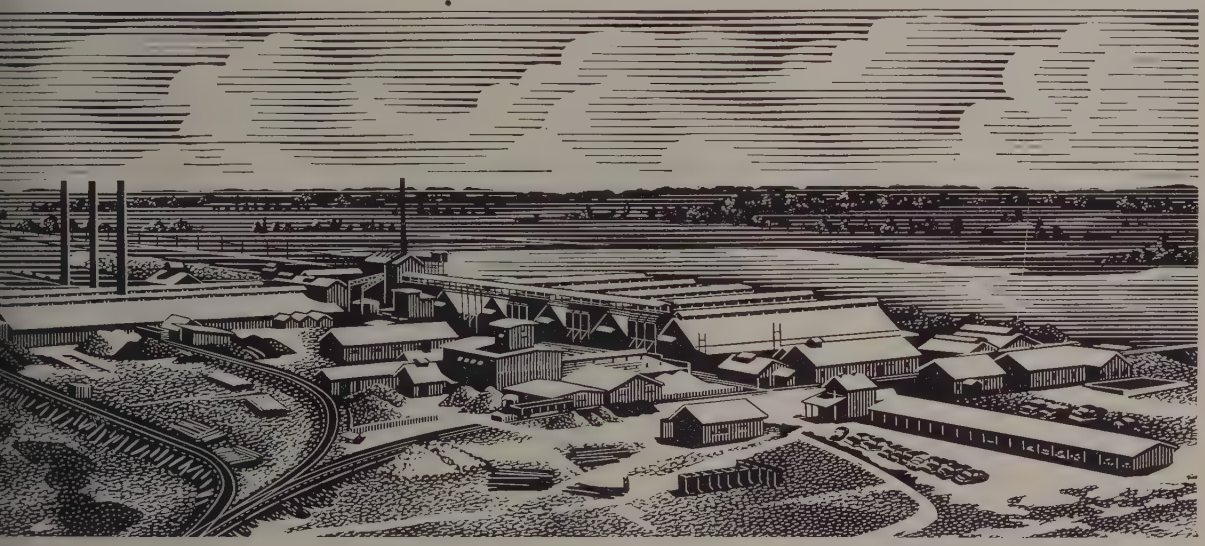
*Estimated

Market Memos

- In October, magnesium ingot duction registered a 6-per-cent crease over September's 5923 tons ports the Magnesium Associa Wrought products dropped from unusual peak of 1079 tons shippe September to 833 tons in Oct Plus signs continue to dominate totals of magnesium casting ments. For the first nine month the year, total shipments are u per cent. Magnesium permanent castings for the period are u per cent, diecastings, 22 per ce
- Titanium sponge metal has bee duced 30 cents a pound, from to $3.45. Titanium Metals Corp America reduced prices for al tanium mill products, too. The ductions on sheet, strip, bar, b wire and plate range from 60 to $3 a pound.
- The rumor persists that lead p are due for another increase.
- Handy & Harman has post price of 91 cents a troy ounce silver. This is a reduction of cents from the price establishe Oct. 19. It is attributed to a sea al decline, as most silver users passed peak season operations.
- Reynolds Metals Co. annou that the Kentucky turnpike will highway signs fabricated from truded aluminum. They fit tog like tongue-and-groove flooring form the sign surface. By aluminum, signs can be made u 30 ft wide, with no restrictio height. Minnesota Mining & Co. received the contract for the minum signs; Reynolds will su the aluminum.

American Zinc and its products *from* A *to* Z





FORT SMITH, ARKANSAS, PLANT OPERATES UNDER CONTRACT WITH AMERICAN ZINC

Zinc smelter, owned and operated by the Athletic Mining and Smelting Company, produces Prime Western slab zinc for American Zinc exclusively. Plant has roasting and nodulizing equipment, as well as horizontal retort furnaces. For complete picture of American Zinc's own operations, see map above.

PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
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SULPHURIC ACID
LEAD-FREE and LEADED ZINC OXIDES
ZINC CARBONATE
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AMERICAN ZINC, LEAD & SMELTING COMPANY

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Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 24.40, pigs 22.50. 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.20; No. 43, 5% Si, 26.00; 142, 4% Cu, 1.5% Mg, 2% Ni, 28.20; No. 195, 4.5% Cu, 0.8% Si, 27.60; No. 214, 3.8% Mg, 27.80; No. 356, 7% Si, 0.3% Mg, 26.20.

Antimony: R.M.M. brand, 99.5%, 33.00, Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 43.00 deld. Conn. Valley; 43.00 deld. Midwest; custom smelters, 46.00-46.50 deld.; Lake, 43.00 deld.; Fire refined, 42.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$120 nom, per troy oz.

Lead: Common, 15.30, chemical, 15.40, corroding, 15.40, St. Louis, New York basis, add 0.20.

Lithium: 99%+, cups, or ingot, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: 99.8%, self-palletizing pig, 32.50; notched ingot, 33.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.00 for both pig and ingot. Sticks 1.3 in. diameter, 53.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, G, H and R, 36.00; alloy M, 38.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $278-$285 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3-$3.25 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100, nom., per troy oz.

Palladium: $22-$24 per troy oz.

Platinum: $97-$112 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $9-$10 per lb.

Silver: Open market, 91.00 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 100.25; prompt, 100.125.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.45, grade A-2 (0.5% Fe max), $3.15 per pound.

Tungsten: Powder, 98.8%, carbon, reduced, 1000-lb lots, $4.50 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99+% hydrogen reduced, $4.65. Treated ingots, $6.70.

Zinc: Prime Western, 13.00; brass special, 13.25; intermediate, 13.50, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.35; special high grade 14.50-14.75, deld. Diecasting alloy ingot No. 3, 17.50; No. 2, 18.50; No. 5, 18.00, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, $10 per lb. Powder electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 31.50-33.50; No. 12 foundry alloy (No. 2 grade) 30.50-30.75; 5% silicon alloy, 0.60 Cu max, 32.00-32.75; 13 alloy, 0.60 Cu max, 32.00-32.75; 195 alloy, 32.00-32.75; 108 alloy, 30.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 31.00-32.00; grade 2, 30.00-31.00; grade 3, 29.00-30.00; grade 4, 28.00-29.00.

Brass Ingot: Red brass No. 115, 41.00; tin bronze No. 225, 54.00; No. 245, 47.25; high-leaded tin bronze No. 305, 44.75; No. 1 yellow No. 405, 32.75; manganese bronze No. 421, 36.25.

Magnesium Alloy Ingot: AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.84; rod, bar, wire, $1.81.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 48.35; 30,000-lb lots 48.88; l.c.l., 48.98. Weatherproof, 100,000-lb lots, 46.03; 30,000-lb lots, 46.28; l.c.l, 46.78. Magnetic wire deld., 15,000 lb or more, 55.52; l.c.l., 56.27.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21 per cwt; pipe, full coils, $21 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $13.10-$13.60; sheared mill plate, $10.50-$12.00; strip, $13.10-$13.60; wire, $9.50-$11.50; forging billets, $7.90-$8.15; hot-rolled and forged bars, $7.90-$8.15.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 20 50; plates 19.50-22.25.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes H.R.	87	74	93
Seamless Tubes	122	110	153
Shot, Blocks	...	71	...

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	——Round—— 2011-T3	2017-T4	—Hexagonal— 2011-T3	2017-T4
Drawn				
0.125	67.9	66.4	...	...
0.156-0.172	57.5	55.9	...	...
0.188	57.5	55.9	...	71.7
0.219-0.234	54.5	52.9	...	...
0.250-0.281	54.5	52.9	...	68.4
0.313	54.5	52.9	...	65.2
Cold-finished				
0.375-0.547	53.4	51.4	63.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1	...	52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9	...	...
1.625-2.000	48.2	46.2	...	50.5
2.125-2.500	47.0	45.0	...	...
2.563-3.375	45.6	43.6	...	...

ALUMINUM

Sheets and Circles: 1100 and 3003 mill (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	C S C
0.249-0 136	37.5	42.3	...	
0.135-0 096	38.0	43.2	...	
0.095-0 077	38.7	44.2	36.1	
0.076-0 061	39.3	45.1	36.3	
0.060-0 048	39.9	45 6	36 7	
0.047-0 038	40.4	46 5	37.2	
0.037-0 030	40.8	47.0	37 6	
0 029-0 024	41.4	47.5	37.9	
0.023-0 019	42.2	49.0	38.8	
0.018-0 017	43.0	...	39.4	
0 016-0.015	43.9	...	40.2	
0 014	44.9	...	41.2	
0.013-0.012	46.1	...	41.9	
0.011	47.1	...	43.1	
0.010-0.0095	48.4	...	44.3	
0.009-0.0085	49.7	...	45.8	
0.008-0.0075	51.3	...	47.0	
0.007	52.8	...	48.5	
0.006	54.4	...	49.9	

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 24-60 in. width or diam. 72-240 in. leng

Alloy	Plate Base	Circle
1100-F, 3003-F	36.5	4
5050-F	37.6	4
3004-F	38.6	4
5052-F	39.9	4
6061-T6	41.1	4
2024-T4*	43.6	4
7075-T6*	51.4	5

*24-48 in. widths or diam, 72-180 in. le

ALUMINUM

Forging Stock: Round, Class 1, 39.10- in specific lengths 36-144 in., diameters 8 in. Rectangles and squares. Class 1, 56.20 in random lengths, 0.375-4 in. widths 0.750-10 in.

Pipe: ASA. Schedule 40, alloy 6063-T6, lengths, plain ends, 90,000-lb base, per 1

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$16.85	2	$
1	26.50	4	
1¼	35.85	6	
1½	42.90	8	

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032 99c; 0.064 in., 78.00c; 0.125 in., 63.50c, lb and over, f.o.b. mill.

Plate: AZ31, 61.00c, 30.000 lb or more, in. and over, widths 24-60 in., lengths in.; tread plate, 64.00c, 30.000 lb or mor in. thick, widths 24-60 in., lengths 60-19 tooling plate 66.00c, 30.000 lbs or more, 3.000 in., widths 60-72 in., lengths 72-1

Extrusions: AZ31 commercial grade, r gles, ¼ x 2 in., 64.70c; 1 x 4 in., 69.50c. 1 in., 61.50c; 2 in., 59.00c. Tubing, 1 i x 0.065 in., 82.50c; Angles, 1 x 1 x 68.40c; 2 x 2 x ¼-in., 62.50c. Chann in., 63.40c. I-beams, 5 in., 62.70c.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lo

Aluminum: 1100 clippings, 19.50-20.00 sheets 16.50-17.25; borings and turnings, 11.50; crankcases, 16.50-17.25; industrial ings 16.50-17.25.

Copper and Brass: No. 1 heavy copper wire 37.50-38.00; No. 2 heavy copper wire, 36.00-36.50; light copper, 33.50-No. 1 composition red brass, 29.50-30.00 1 composition turnings, 27.50-28.00; y

BRASS MILL PRICES

	MILL PRODUCTS a					SCRAP ALLOWANCE		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	C Tu
Copper	62.76-63.13b	60.36c	....	62.82–63.32	39 000	39 000	3
Yellow Brass	52.27	42.41d	52.81	55.18	28.875	28.625	2
Red Brass, 85%	58.09	58.03	58 63	60.90	34.250	34 000	3
Low Brass, 80%	56.55	56.49	57 09	59.36	32 750	32 250	3
Naval Brass	55.63	49.94	62.69	58.79	26 750	26.500	2
Com. Bronze, 90%	60.18	60.12	60.72	62.74	35 750	35.500	3
Nickel Silver, 10%	66.00	68.33g	68.33	....	32 500	32 250	1
Phos. Bronze, A, 5%	80.99	81.49	81.49	82.67	39 250	39 000	3
Silicon Bronze	66.54	65.73	66.58	68.68e	37 625	37.375	3
Manganese Bronze	59.37-59.45	53.38-53.47	63.82	....	27 000	26.750	2
Muntz Metal	53.74	49.55	....	....	27.000	26.750	2

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-d d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20.000 lb. f.o.b. shi point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Le

ss turnings, 16.00-16.50; new brass clip-gs, 24.50-25.00; light brass, 16.50-17.00; vy yellow brass, 19.50-20.00; new brass ends, 23.50-24.00; auto radiators, un-ated, 22.50-23.00; cocks and faucets, 24.00-0; brass pipe, 24.50-25.00.

d: Heavy, 12.00-12.50; battery plates, 6.50-; linotype and stereotype, 13.25-14.25; elec-ype, 12.00-12.75; mixed babbitt, 14.50.

nesium: Clippings, 18.50-19.50; clean cast-, 18.00-19.00; iron castings, not over 10% ovable Fe, less full deduction for Fe, 16.00-0.

el: Clippings, 54.50-60.00; old sheets, 0-50.00; turnings, 44.00; rods, 54.50-60.00.

kel: Sheets and clips, 90.00-125.00; rolled les, 90.00-125.00; turnings, 75.00-100.00; ends, 90.00-125.00.

: Old zinc, 5.00-6.00; new die-cast scrap, -5.75; old die-cast scrap, 3.25-3.50.

REFINER'S BUYING PRICES

nts per pound, carlots, delivered refinery)

minum: 1100 clippings, 23.00-23.50; 3003 pings, 22.75-23.50; 6151 clippings, 22.50-0; 5052 clippings, 22.50-23.50; 2014 clip-s, 22.50; 2017 clippings, 22.50; 2024 clip-s, 22.50; mixed clippings, 22.00-22.50; old t, 19.50-20.00; old cast, 20.00-20.50; clean cable (free of steel), 23.00-23.50; borings turnings, 20.00-21.00.

yllium Copper: Heavy scrap, 0.020-in. and ier, not less than 1.5% Be, 65.00; light p, 60.00; turnings and borings, 43.00-55.00.

per and Brass: No. 1 heavy copper and , 40.50; No. 2 heavy copper and wire, 0; light copper, 36.75; refinery brass (60% per) per dry copper content, 37.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

per and Brass: No. 1 heavy copper and , 40.50; No. 2 heavy copper and wire, 0; light copper, 36.75; No. 1 composition ngs, 32.50-33.50; No. 1 composition solids, 0-34.00; heavy yellow brass solids, 22.50-0; yellow brass turnings, 21.50; radiators, 0.

PLATING MATERIAL

.b. shipping point, freight allowed on ntities)

ANODES

mium: Special or patented shapes, $1.70 lb.

per: Flat-rolled, 59.42-59.79, oval, 58.92. -10,000 lb; electrodeposited, 56.78. 2000-lb lots; cast 62.54, 5000-10,000 lb quanti-

el: Depolarized, less than 100 lb, $1.015; 499 lb, 99.50; 500-4999 lb, 95.50; 5000-99 lb, 93.50; 30,000 lb, 91.50. Carbonized, ct 3 cents a lb. All prices eastern delivery tive Jan. 1, 1955.

Bar or slab, less than 200 lb, $1.175; 499 lb, $1.16; 500-999 lb, $1.155; 1000 lb ore, $1.15.

: Balls, 21.00; flat tops, 21.00; flats, 5; ovals, 22.00, ton lots.

CHEMICALS

mium Oxide: $2.15 per lb, in 100-lb drums.

omic Acid: Less than 10,000 lb, 28.50; over 00 lb, 27.50.

per Cyanide: 100 lb, 85.25; 200 lb, 84.50; lb, 84.25; 400-900 lb, 85.50; 1000 lb, 81.50.

per Sulphate: 500-1900 lb, 17.90; 2000-5900 5.90; 6000 lb or more, 15.65.

el Chloride: 100 lb, 46.50; 200 lb, 44.50; lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 9.50; 10,000 lb and over, 38.50. All prices ern delivery, effective Jan. 1, 1955.

el Sulphate: 100 lb, 38.25; 200 lb, 36.25; lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 31.25; 36,000 lb 30.25. All prices eastern very, effective Jan. 1, 1955.

r Cyanide: (Cents per ounce) 4-oz bottle, 75; 16-oz bottle, 85.625; 80-oz bottle, 25; 100-oz bottle, 83.125; f.o.b. St. Louis, York and Los Angeles. Effective Sept. 1955.

um Cyanide: Egg, under 1000 lb, 19.80; -19,900 lb, 18.80; 20,000 lb and over, ; granular, add 1-cent premium to above.

um Stannate: Less than 100 lb, 74.00; 100-lb, 59.60; 700-1900 lb, 57.10; 2000-9900 5.30; 10,000 lb or more, 54.20.

nous Chloride (Anhydrous): Less than 50 $1.606; 50 lb, $1.266; 100-300 lb, $1.116; 900 lb, $1.092; 1000-1900 lb, $1.068; 2000-lb, $1.031; 5000-19,900 lb, 97.00; 20,000 r more, 90.90.

nous Sulphate: Less than 50 lb, $1.304; b. $1.004; 100-1900 lb, 98.40; 2000 lb or , 96.40.

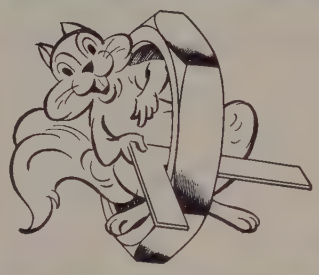
Cyanide: Under 1000 lb, 54.30; 1000 lb over, 52.30.

There's *this* about "Fischer Turned" BRASS AND ALUMINUM NUTS

CLASS 2 PRECISION THREADS

COUNTERSUNK BOTH SIDES

TAPPED THROUGH & SQUARE WITH FACE



BURRLESS

CLEANED AND DEGREASED

PROMPT DELIVERY

All nuts are not the same. Fischer brass and aluminum nuts, for example, are *precision turned*... making possible new economies in assembly operations.

You pay no premium for this extra quality... Fischer *turned* nuts cost no more than those produced by other, less accurate methods.

A complete range of standard types and sizes is stocked at the factory... "specials" are produced quickly and inexpensively.

1905-1955 50th ANNIVERSARY FISCHER SPECIAL MFG. CO. CINCINNATI, OHIO

Fischer SPECIAL MFG. CO.

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Cincinnati 6, Ohio

Write today for complete catalog

C-271-FS

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key on page 181. Key to footnotes, Page 183.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$65.50

INGOTS, Alloy (NT)
Detroit R7 .....$69.00
Houston S5 .....74.00
Midland,Pa. C18 .....69.00
Munhall,Pa. U5 .....69.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)
Aliquippa,Pa. J5 ....$68.50
Bessemer,Pa. U5 .....68.50
Bridgeport,Conn. N19..73.50
Buffalo R2 .....68.50
Clairton,Pa. U5 .....68.50
Ensley,Ala. T2 .....68.50
Fairfield,Ala. T2 .....68.50
Fontana,Calif. K1 ....76.00
Gary, Ind. U5 .....68.50
Johnstown,Pa. B2 ....68.50
Lackawanna,N.Y. B2 ..68.50
LoneStar,Tex. L6 ....74.50
Munhall, Pa. U5 .....68.50
Pittsburgh J5 .....68.50
S.Chicago,Ill. R2, U5..68.50
S.Duquesne,Pa. U5 ...68.50
Youngstown R2 .....68.50

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$84.50
Bessemer,Pa. U5 .....84.50
Bridgeport,Conn. N19..89.50
Buffalo R2 .....84.50
Canton,O. R2 .....86.50
Clairton,Pa. U5 .....84.50
Conshohocken,Pa. A3..89.50
Ensley,Ala. T2 .....84.50
Fairfield,Ala. T2 .....84.50
Fontana,Calif. K1 ....92.00
Gary,Ind. U5 .....84.50
Geneva,Utah C11 .....84.50
Houston S5 .....89.50
Johnstown,Pa. B2 ....84.50
Lackawanna,N.Y. B2..84.50
Los Angeles B3 .....94.00
Midland,Pa. C18 .....84.50
Munhall,Pa. U5 .....84.50
Pittsburgh J5 .....84.50
Seattle B3 .....98.00
S.Chicago R2,U5,W14..84.50
S.Duquesne,Pa. U5 ....84.50
S.SanFrancisco B3 ....94.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$96.00
Buffalo R2 .....96.00
Canton,O. R2, T7 ...96.00
Conshohocken,Pa. A3..103.00
Detroit R7 .....96.00
Fontana,Calif. K1 ....115.00
Gary,Ind. U5 .....96.00
Houston S5 .....101.00
Ind.Harbor,Ind. Y1 ...96.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 .....116.00
Massillon,O. R2 .....96.00
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
S.Chicago R2,U5,W14..96.00
S.Duquesne,Pa. U5 ...96.00
Struthers,O. Y1 .....96.00
Warren,O. C17 .....96.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$103.50
Canton,O. R2 .....103.50
Cleveland R2 .....103.50
Gary,Ind. U5 .....103.50
S.Chicago R2, W14 ...103.50
S.Duquesne,Pa. U5 ...103.50

SKELP
Aliquippa,Pa. J5 .....4.325
LoneStar,Tex. L6 ....4.625
Munhall,Pa. U5 .....4.225
SparrowsPoint,Md. B2..4.225
Warren,O. R2 .....4.225
Youngstown R2, U5 ...4.225

WIRE RODS
AlabamaCity,Ala. R2 ..5.025
Aliquippa,Pa. J5 .....5.025
Alton,Ill. L1 .....5.20
Buffalo B11, W12 ....5.025
Cleveland A7 .....5.025
Donora,Pa. A7 .....5.025
Fairfield,Ala. T2 .....5.025
Houston S5 .....5.275
IndianaHarbor,Ind. Y1.5.025
Johnstown,Pa. B2 ....5.025
Joliet,Ill. A7 .....5.025
KansasCity,Mo. S5 ....5.275
Kokomo,Ind. C16 .....5.125
LosAngeles B3 .....5.825
Minnequa,Colo. C10 ...5.275
Monessen,Pa. P7 .....5.025
N.Tonawanda,N.Y. B11.5.025
Pittsburg,Calif. C11 ...5.675
Portsmouth P12 .....5.025
Roebling,N.J. R5 .....5.125
S.Chicago,Ill. R2 .....5.025
SparrowsPoint,Md. B2..5.125
Sterling,Ill.(1) N15 ....5.025
Sterling,Ill. N15 .....5.125
Struthers,O. Y1 .....5.025
Worcester,Mass. A7 ...5.325

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 .....4.60
Aliquippa,Pa. J5 .....4.60
Bessemer,Ala. T2 .....4.60
Bethlehem,Pa. B2 .....4.65
Birmingham C15 .....5.10
Clairton,Pa. U5 .....4.60
Fairfield,Ala. T2 .....4.60
Fontana,Calif. K1 .....5.25
Gary,Ind. U5 .....4.60
Geneva,Utah C11 .....4.60
Houston S5 .....4.70
Ind.Harbor,Ind. I-2 ....4.60
Johnstown,Pa. B2 .....4.65
KansasCity,Mo. S5 ....4.70
Lackawanna,N.Y. B2 ...4.65
LosAngeles B3 .....5.30
Minnequa,Colo. C10 ....4.90
Munhall,Pa. U5 .....4.60
Niles,Calif. P1 .....4.90
Portland,Oreg. O4 ....5.35
Phoenixville,Pa. P4 ....5.15
Seattle B3 .....5.35
S.Chicago U5, W14 ....4.60
S.SanFrancisco B3 ....5.25
Torrance,Calif. C11 ....5.30
Weirton,W.Va. W6 ....4.60

Wide Flange
Bethlehem,Pa. B2 .....4.65
Clairton,Pa. U5 .....4.60
Fontana,Calif. K1 ....5.40
Lackawanna,N.Y. B2 ...4.65
Munhall,Pa. U5 .....4.60
Phoenixville,Pa. P4 ....5.15
S.Chicago,Ill. U5 .....4.60

Alloy Std. Shapes
Clairton,Pa. U5 .....5.65
Fontana,Calif. K1 .....7.30
Gary,Ind. U5 .....5.65
Houston S5 .....5.75
Munhall,Pa. U5 .....5.65
S.Chicago,Ill. U5 .....5.65

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....6.75
Bessemer,Ala. T2 .....6.75
Bethlehem,Pa. B2 .....6.80
Clairton,Pa. U5 .....6.75
Fairfield,Ala. T2 .....6.75
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 .....6.75
Geneva,Utah C11 .....6.75
Houston S5 .....6.85
Ind.Harbor,Ind. I-2, Y1.6.75
Johnstown,Pa. B2 .....6.80
KansasCity,Mo. S5 ....6.85
Lackawanna,N.Y. B2 ..6.80
LosAngeles B3 .....7.45
Munhall,Pa. U5 .....6.75
Seattle B3 .....7.50
S.Chicago,Ill. U5, W14..6.75
S.SanFrancisco B3 ....7.40
Struthers,O. Y1 .....6.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ....6.80
Lackawanna,N.Y. B2 ..6.80
Munhall,Pa. U5 .....6.75
S.Chicago,Ill. U5 .....6.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....4.65
Lackawanna,N.Y. B2 ..4.65
Munhall,Pa. U5 .....4.60
S.Chicago,Ill. U5 .....4.60

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....5.45
Lackawanna,N.Y. B2 ...5.45
Munhall,Pa. U5 .....5.45
S.Chicago,Ill. U5 .....5.45

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 .....4.50
Aliquippa,Pa. J5 .....4.50
Ashland,Ky.(15) A10 ...4.50
Bessemer,Ala. T2 .....4.50
Bridgeport,Conn. N19 ..4.75
Buffalo R2 .....4.50
Clairton,Pa. U5 .....4.50
Claymont,Del. C22 ....4.80
Cleveland J5, R2 .....4.60
Coatesville,Pa. L7 ....4.80
Conshohocken,Pa. A3 ..4.50
Detroit M1 .....4.60
Ecorse,Mich. G5 .....4.60
Fairfield,Ala. T2 .....4.50
Fontana,Calif.(30) K1 ..5.15
Gary,Ind. U5 .....4.50
Geneva,Utah C11 .....4.50
GaniteCity,Ill. G4 ....4.70
Harrisburg,Pa. P4 .....5.10
Houston S5 .....4.60
Ind.Harbor,Ind. I-2, Y1.4.50
Johnstown,Pa. B2 .....4.50
Lackawanna,N.Y. B2 ..4.50
LoneStar,Tex. L6 .....4.85
Mansfield,O. E6 .....4.50
Minnequa,Colo. C10 ....5.35
Munhall,Pa. U5 .....4.50
Newport,Ky. N9 .....4.50
Pittsburgh J5 .....4.50
Riverdale,Ill. A1 .....4.50
Seattle B3 .....5.40
Sharon,Pa. S3 .....4.50
S.Chicago R2, U5, W14.4.50
SparrowsPoint,Md. B2 ..4.50
Steubenville,O. W10 ....4.50
Warren,O. R2 .....4.50
Weirton,W.Va. W6 ....4.50
Youngstown R2, U5, Y1.4.50

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 .....5.65
Fontana,Calif. K1 .....6.30
Geneva,Utah C11 .....5.65
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 .5.65

PLATES, Wrought Iron
Economy,Pa. B14 ....10.40

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.725
Bessemer,Ala. T2 .....6.725
Clairton,Pa. U5 .....6.725
Cleveland J5, R2 ....6.725
Claymont,Del. C22 ....6.725
Coatesville,Pa. L7 ....6.725
Conshohocken,Pa. A3 ..6.725
Ecorse,Mich. G5 .....6.825
Fairfield,Ala. T2 ....6.725
Fontana,Calif.(30) K1 .7.375
Gary,Ind. U5 .....6.725
Geneva,Utah C11 .....6.725
Houston S5 .....6.825
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 ....6.725
LosAngeles B3 .....7.625
Munhall,Pa. U5 .....6.725
Pittsburgh J5 .....6.725
Seattle B3 .....7.625
Sharon,Pa. S3 .....6.725
S.Chicago,Ill. U5, W14.6.725
SparrowsPoint,Md. B2..6.725
Youngstown U5, Y1 ...6.725

PLATES, Alloy
Bridgeport,Conn. N19 ...6.55
Claymont,Del. C22 ....6.30
Coatesville,Pa. L7 .....6.30
Fontana,Calif. K1 .....6.95
Gary,Ind. U5 .....6.30
Houston S5 .....6.40
Ind.Harbor,Ind. Y1 ....6.30
Johnstown,Pa. B2 .....6.30
Munhall,Pa. U5 .....6.30
Newport,Ky. N9 .....6.30
Seattle B3 .....7.20
Sharon,Pa. S3 .....6.30
S.Chicago,Ill. U5, W14..6.30
SparrowsPoint,Md. B2 ..6.30
Youngstown Y1 .....6.30

FLOOR PLATES
Cleveland J5 .....5.575
Conshohocken,Pa. A3 ..5.575
Harrisburg,Pa. P4 .....5.575
Ind.Harbor,Ind. I-2 ...5.575
Munhall,Pa. U5 .....5.575
S.Chicago,Ill. U5 .....5.575

PLATES, Ingot Iron
Ashland c.l. (15) A10...4.75
Ashland l.c.l. (15) A10..5.25
Cleveland c.l. R2 .....5.10
Warren,O. c.l. R2 .....5.10

BARS

BARS, Hot-Rolled Carbon
Ala.City,Ala. R2 .....4.65
Aliquippa,Pa. J5 .....4.65
Alton,Ill. L1 .....4.85
Atlanta A11 .....4.85
Bessemer,Ala. T2 .....4.65
Birmingham C15 .....5.15
Bridgeport,Conn. N19 ..4.80
Buffalo R2 .....4.65
Canton,O. R2 .....4.75
Clairton,Pa. U5 .....4.65
Cleveland R2 .....4.65
Ecorse,Mich. G5 .....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala. T2 .....4.65
FairlessHills,Pa. U5 ....4.80
Fontana,Calif. K1 .....5.35
Gary,Ind. U5 .....4.65
Houston S5 .....4.90
Ind.Harbor,Ind. I-2, Y1.4.65
Johnstown,Pa. B2 .....4.65
Joliet,Ill. P22 .....4.65
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ...4.65
LosAngeles B3 .....5.35
Massillon,O. R2 .....4.75
Midland,Pa. C18 .....4.65
Milton,Pa. M18 .....4.65
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.00
N.Tonawanda,N.Y. B11..4.65
Pittsburg,Calif. C11 ...5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
Seattle B3, N14 .....5.40
S.Chicago R2, U5, W14..4.65
S.Duquesne,Pa. U5 ....4.65
S.SanFran.,Calif. B3 ...5.40
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ....5.35
Warren,O. R2 .....4.65
Weirton,W.Va. W6 ....4.65
Youngstown R2, U5 ....4.65

BARS, H.R. Leaded Alloy
Warren,O. C17 .....6.325

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....5.575
Bridgeport,Conn. N19 .5.725
Buffalo R2 .....5.575
Canton,O. R2, T7 ....5.575
Clairton,Pa. U5 .....5.575
Detroit R7 .....5.575
Ecorse,Mich. G5 .....5.675
Fontana,Calif. K1 ....6.625
FairlessHills,Pa. U5 ....5.725
Gary,Ind. U5 .....5.575
Houston S5 .....5.825
Ind.Harbor,Ind. I-2,Y1.5.575
Johnstown,Pa. B2 ....5.575
KansasCity,Mo. S5 ....5.825
Lackawanna,N.Y. B2 ...5.575
LosAngeles B3 .....6.625
Massillon,O. R2 .....5.575
Midland,Pa. C18 .....5.575
S.Chicago, R2, U5, W14.5.575
S.Duquesne,Pa. U5 ....5.575
Struthers,O. Y1 .....5.575
Warren,O. C17 .....5.575
Youngstown U5 .....5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.80
Bessemer,Ala. T2 .....6.80
Bethlehem,Pa. B2 ....6.80
Clairton,Pa. U5 .....6.80
Cleveland R2 .....6.80
Ecorse,Mich. G5 .....6.90
Fairfield,Ala. T2 .....6.80
Fontana,Calif. K1 ....7.50
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
Ind.Harb..Ind. I-2, Y1 ..6.80
Johnstown,Pa. B2 ....6.80
KansasCity,Mo. S5 ....7.05
Lackawanna,N.Y. B2 ...6.80
LosAngeles B3 .....7.50
Pittsburgh J5 .....6.80
Seattle B3 .....7.55
S.Chicago W14 .....6.80
S.Duquesne,Pa. U5 ....6.80
S.SanFrancisco B3 ....7.55
Struthers,O. Y1 .....6.80
Warren,O. R2 .....6.80
Youngstown U5 .....6.80

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa. B2 .....4.80

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....4.65
Atlanta A11 .....4.85
Fontana,Calif. K1 .....5.35
Niles,Calif. P1 .....5.00
Pittsburgh J5 .....
Portland,Oreg. O4 ...
SanFrancisco S7 ....

BAR SHAPES, Hot-Rolled
Clairton,Pa. U5 .....
Gary,Ind. U5 .....
Houston S5 .....
KansasCity,Mo. S5 ..
Youngstown U5 .....

BARS, C.F. Leaded Alloy
Ambridge,Pa. W18 ...
Camden,N.J. P13 ...
Chicago W18 .....
Cleveland C20 .....
Monaca,Pa. S17 .....
Newark,N.J. W18 ...
SpringCity,Pa. K3 ..
Warren,O. C17 .....

BARS, Cold-Finished Carb
Ambridge,Pa. W18 ..
BeaverFalls,Pa. M12, R
Buffalo B5 .....
Camden,N.J. P13 ....
Carnegie,Pa. C12 ...
Chicago W18 .....
Cleveland A7, C20 ..
Detroit R7 .....
Detroit B5, P17 .....
Donora,Pa. A7 .....
Elyria,O. W18 .....
FranklinPark,Ill. N5 .
Gary,Ind. R2 .....
GreenBay,Wis. F7 ..
Hammond,Ind. L2, M1
Hartford,Conn. R2 ..
Harvey,Ill. B5 .....
LosAngeles R2, S30 ..
Mansfield,Mass. B5 ..
Massillon,O. R2, R8 ..
Midland,Pa. C18 ....
Monaca,Pa. S17 .....
Newark,N.J. W18 ...
NewCastle,Pa.(17) B4
Pittsburgh J5 .....
Plymouth,Mich. P5 ..
Putnam,Conn. W18 ..
Readville,Mass. C14 ..
S.Chicago,Ill. W14 ..
SpringCity,Pa. K3 ...
Struthers,O. Y1 .....
Waukegan,Ill. A7 ...
Worcester,Mass. W19
Youngstown F3, Y1 ..

BARS, Cold-Finished Carb (Turned and Ground)
Cumberland,Md. C19

BARS, Cold-Finished Allo
Ambridge,Pa. W18 ...
BeaverFalls,Pa. M12,R2
Bethlehem,Pa. B2 ...
Buffalo B5 .....
Camden,N.J. P13 ....
Canton,O. T7 .....
Carnegie,Pa. C12 ....
Chicago W18 .....
Cleveland A7, C20 ...
Detroit R7 .....
Detroit B5, P17 .....
Donora,Pa. A7 .....
Elyria,O. W8 .....
Gary,Ind. R2 .....
GreenBay,Wis. F7 ...
Hammond,Ind. L2, M13
Hartford,Conn. R2 ...
Harvey,Ill. B5 .....
Lackawanna,N.Y. B2 ..
LosAngeles S30 .....
Mansfield,Mass. B5 ..
Massillon,O. R2, R8 ..
Midland,Pa. C18 .....
Monaca,Pa. S17 .....
Newark,N.J. W18 ....
Plymouth,Mich. P5 ...
S.Chicago W14 .....
SpringCity,Pa. K3 ...
Struthers,O. Y1 .....
Warren,O. C17 .....
Waukegan,Ill. A7 ...
Worcester,Mass. A7 ..
Youngstown F3, Y1 ..

BARS, Reinforcing (To Fabricators)
Ala.City,Ala. R2 ....
Altanta A11 .....
Birmingham C15 .....
Buffalo R2 .....
Cleveland R2 .....
Ecorse,Mich. G5 .....
Emeryville,Calif. J7 .
Fairfield,Ala. T2 ....
FairlessHills,Pa. U5 ..
Fontana,Calif. K1 ...
Ft.Worth,Tex.(42) T4 .
Gary,Ind. U5 .....
Houston S5 .....

.Harbor,Ind. I-2, Y1 4.65
nstown,Pa. B2 ..... 4.65
iet,Ill. P22 ..... 4.65
nsasCity,Mo. S5 .... 4.90
kawanna,N.Y. B2 .. 4.65
Angeles B3 ..... 5.35
ton,Pa. M18 ..... 4.65
nnequa,Colo. C10 .... 5.10
es,Calif. P1 ..... 5.00
tsburg,Calif. C11 .... 5.35
tsburgh J5 ..... 4.65
rtland,Oreg. O4 ..... 5.40
ndSprings,Okla, S5 .. 5.15
ttle B3, N14 ..... 5.40
hicago R2 ..... 4.65
uquesne,Pa. U5 .... 4.65
anFrancisco B3 .... 5.40
rrowsPoint,Md. B2 .. 4.65
rling,Ill.(1) N15 .... 4.65
rling,Ill. N15 ..... 4.75
uthers,O. Y1 ..... 4.65
rrance,Calif. C11 .... 5.35
ngstown R2, U5, Y1 4.65

S, Reinforcing Fabricated; to Consumers)

nstown,Pa. ¼-1" B2 6.15
nsasCity,Kans. S5 .. 6.45
kawanna,N.Y. B2 .. 6.17
rion,O. P11 ..... 5.90
tsburgh U8 ..... 6.17
ttle B3, N14 ..... 6.60
rrowsPt. ½-1" B2.. 6.15
liamsport, Pa. S19 .. 6.00

L STEEL BARS

s,Pa.(3) J8 ..... 4.50
cagoHts.(3) C2, I-2.. 4.65
cagoHts.(4) C2, I-2.. 4.65
Worth,Tex.(26) T4... 5.10
nklin,Pa.(3) F5 .... 4.65
nklin,Pa.(4) F5 .... 4.65
rion,O.(3) P11 ..... 4.50
line,Ill.(3) R2 ..... 4.65
awanda(3) B12 .... 4.50
awanda(4) B12 .... 4.65
liamsport,Pa.(3) S19 4.65

S, Wrought Iron

nomy,Pa.(S.R.)B14 11.50
nomy,Pa(D.R.)B14 14.30
nomy(Staybolt)B14 14.65
K.Rks. (S.R.) L5 ..11.50
K.Rks. (D.R.) L5 ..16.00
K.Rks.(Staybolt) L5.17.00

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ..... 4.325
Allenport,Pa. P7 ..... 4.325
Ashland,Ky.(8) A10 .. 4.325
Cleveland J5, R2 .... 4.325
Conshohocken,Pa. A3 .. 4.375
Detroit(8) M1 ..... 4.425
Dravosburg,Pa. U5 .... 4.325
Ecorse,Mich. G5 ..... 4.425
Fairfield,Ala. T2 ..... 4.325
FairlessHills,Pa. U5 .. 4.375
Fontana,Calif. K1 .... 5.075
Gary,Ind. U5 ..... 4.325
Geneva,Utah C11 .... 4.425
GraniteCity,Ill. G4 .... 4.525
Ind.Harbor,Ind. I-2, Y1 4.325
Kokomo,Ind. C16 .... 4.425
Lackawanna,N.Y. B2 .. 4.325
Mansfield,O. E6, (37) .. 4.325
Munhall,Pa. U5 ..... 4.325
Newport,Ky.(8) N9 .. 4.325
Niles,O. N12 ..... 4.325
Pittsburg,Calif. C11 ... 5.025
Pittsburgh J5 ..... 4.325
Portsmouth,O. P12 .... 4.325
Riverdale,Ill. A1 ..... 4.325
Sharon,Pa. S3 ..... 4.325
S.Chicago,Ill. W14 .... 4.325
SparrowsPoint,Md. B2.4.325
Steubenville,O. W10 .. 4.325
Warren,O. R2 ..... 4.325
Weirton,W.Va. W6 .. 4.325
Youngstown U5, Y1 .. 4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 ..... 5.625
Kokomo,Ind. C16 .... 5.475
Niles,O. N12 ..... 5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 .... 7.20
Youngstown Y1 ..... 7.20

SHEETS, H.R.(14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 ..... 6.375
Conshohocken,Pa. A3 .. 6.425
Dravosburg,Pa. U5 .... 6.375
Ecorse,Mich. G5 .... 6.475
Fairfield,Ala. T2 .... 6.375
FairlessHills,Pa. U5 .. 6.425
Fontana,Calif. K1 .... 7.125
Gary,Ind. U5 ..... 6.375
Ind.Harbor,Ind. I-2, Y1 6.375
Lackawanna(35) B2 .. 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
Sharon,Pa. S3 ..... 6.375
S.Chicago,Ill. U5 ..... 6.375
SparrowsPoint(36) B2.. 6.375
Warren,O. R2 ..... 6.375
Weirton,W.Va. W6 .... 6.375
Youngstown U5, Y1.... 6.375

SHEET, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 .. 4.575
Ind.Harbor,Ind. I-2 ... 4.575

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 ..... 5.325
Cleveland J5, R2 .... 5.325
Conshohocken,Pa. A3 .. 5.375
Dravosburg,Pa. U5 .... 5.325
Detroit M1 ..... 5.325
Ecorse,Mich. G5 ..... 5.425
Fairfield,Ala. T2 ..... 5.325
FairlessHills,Pa. U5 .. 5.375
Follansbee,W.Va. F4 .. 5.325
Fontana,Calif. K1 .... 6.425
Gary,Ind. U5 ..... 5.325
GraniteCity, Ill. G4 .... 5.525
Ind.Harbor,Ind. I-2, Y1 5.325
Lackawanna,N.Y. B2 .. 5.325
Mansfield,O. E6 ..... 5.325
Middletown,O. A10 .... 5.325
Newport,Ky. N9 ..... 5.325
Pittsburg,Calif. C11 .. 6.275
Pittsburgh J5 ..... 5.325
Portsmouth,O. P12 .... 5.325
SparrowsPoint,Md. B2.. 5.325
Steubenville,O. W10 .. 5.325
Warren,O. R2 ..... 5.325
Weirton,W.Va. W6 .... 5.325
Youngstown Y1 ..... 5.325

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 .... 7.875
Dravosburg,Pa. U5 .. 7.875
Ecorse,Mich. G5 ..... 7.975
FairlessHills,Pa. U5 .. 7.925
Fontana,Calif. K1 .... 8.975
Gary,Ind. U5 ..... 7.875
IndianaHarbor,Ind. Y1. 7.875
Lackawanna(37) B2 .. 7.875
Pittsburgh J5 ..... 7.875
SparrowsPoint(38) B2.. 7.875
Warren,O. R2 ..... 7.875
Weirton,W.Va. W6 .... 7.875
Youngstown Y1 ..... 7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 .... 5.825

SHEETS, Culvert (16 Gage)	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.90	...
Canton,O. R2	6.10	6.55
Dravosburg U5	6.10	...
Fairfield T2	6.10	...
Gary,Ind. U5	6.10	6.35
Ind.Harbor I-2	6.10	6.35
Kokomo,Ind. C16	6.20	...
MartinsFry. W10	6.10	...
Newport,Ky. N9	6.10	6.35
Pitts.,Calif. C11	6.85	...
SparrowsPt. B2	6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 ..... 7.15
Gary,Ind. U5 ..... 6.35
MartinsFry.,O. W10 .... 6.35

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 ..... 5.85‡
Ashland,Ky. A10 ..... 5.85†
Canton,O. R2 ..... 5.85‡
Delphos,O. N16 ..... 6.60‡
Dover,O. R1 ..... 5.85‡
Dravosburg,Pa. U5 ... 5.85†
Fairfield,Ala. T2 ..... 5.85†
Gary,Ind. U5 ..... 5.85*
GraniteCity,Ill. G4 .... 6.05
Ind.Harbor,Ind. I-2 ... 5.85†
Kokomo,Ind. C16 ..... 5.95‡
MartinsFerry,O. W10 .. 5.85*
Middletown,O. A10 .... 5.85†
Newport,Ky. N9 ..... 5.85‡
Niles,O. N12 ..... 6.85‡
Pittsburg,Calif. C1 .... 6.60*
SparrowsPt.,Md. B2 .. 5.85†
Steubenville,O. W10 ... 5.85‡
Warren,O. R2 ..... 5.85†
Weirton,W.Va. W6 .... 5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 .... 6.575

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 .... 8.60
SparrowsPoint(39) B2 .. 8.60

SHEETS, Galvannealed Steel

Canton,O. R2 ..... 6.25
Dravosburg,Pa. U5 .... 6.25
Kokomo,Ind. C16 ..... 6.60
Newport,Ky. N9 ..... 6.25
Niles,O. N12 ..... 7.25

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 ..... 6.10
Middletown,O. A10 .... 6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 ..... 6.70
Niles,O.(28) R2 ..... 6.70
Weirton,W.Va. W6 .... 6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.50
Butler,Pa. A10 (type 2) 8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 ..... 5.90
Cleveland R2 ..... 5.90
Dravosburg,Pa. U5 .... 5.90
Gary,Ind. U5 ..... 5.90
GraniteCity,Ill. G4 .... 6.10
Ind.Harbor,Ind. I-2 .... 5.90
Middletown,O. A10 .... 5.90
Niles,O. N12 ..... 5.90
Youngstown Y1 ..... 5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ... 7.75
Ind.Harbor,Ind. I-2 .... 7.75
Yorkville,O. W10 ..... 7.75

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 ..... 6.25
Mansfield,O. E6 ..... 6.25
Middletown,O. A10 .... 6.25
Niles,O. N12 ..... 6.25
Weirton,W.Va. W6 .... 6.25

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10 ... 6.65

Key to Producers

Acme Steel Co.
Alan Wood Steel Co.
Allegheny Ludlum Steel
Alloy Metal Wire Div., H. K. Porter Co. Inc.
American Shim Steel Co.
American Steel & Wire Div., U. S. Steel Corp.
Anchor Drawn Steel Co.
Angell Nail & Chaplet
Armco Steel Corp.
Atlantic Steel Co.

Babcock & Wilcox Co.
Bethlehem Steel Co.
Beth. Pac. Coast Steel
Blair Strip Steel Co.
Bliss & Laughlin Inc.
Braeburn Alloy Steel
Brainard Steel Div., Sharon Steel Corp.
E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
Buffalo Steel Division H. K. Porter Co. Inc.
A. M. Byers Co.
J. Bishop & Co.

Calstrip Steel Corp.
Calumet Steel Div. Borg-Warner Corp.
Carpenter Steel Co.
Cleve. Cold Rolling Mills
Cold Metal Products Co.
Colonial Steel Co.
Colorado Fuel & Iron
Columbia-Geneva Steel
Columbia Steel & Shaft.
Columbia Tool Steel Co.
Compressed Steel Shaft.
Connors Steel Div. H. K. Porter Co. Inc.
Continental Steel Corp.
Copperweld Steel Co.
Crucible Steel Co.
Cumberland Steel Co.

C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div. Sharon Steel Corp.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Division, H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Whickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	..4.325
Allenport,Pa. P7	.....4.325
Alton,Ill. L1	.....4.50
Ashland,Ky.(8) A10	..4.325
Atlanta A11	.....4.525
Bessemer,Ala. T2	....4.325
Birmingham C15	*.....4.825*
Bridgeport,Conn. N19	..4.625
Buffalo(27) R2	.....4.325
Conshohocken,Pa. A3	..4.375
Detroit M1	.....4.425
Ecorse,Mich. G5	.....4.425
Fairfield,Ala. T2	.....4.325
Fontana,Calif. K1	....5.075
Gary,Ind. U5	.....4.325
Ind.Harbor,Ind. I-2, Y1	4.325
Johnstown,Pa.(25) B2	..4.325
Lackaw'na,N.Y.(24) B2	4.325
LosAngeles(25) B3	....5.075
Milton,Pa. M18	.....4.325
Minnequa,Colo. C10	..5.425
NewBritain(10) S15	..4.325
N.Tonawanda,N.Y. B11	4.325
Pittsburg,Calif. C11	..5.075
Portsmouth,O. P12	....4.325
Riverdale,Ill. A1	.....4.325
SanFrancisco S7	.....5.05
Seattle(25) B3	.....5.325
Seattle N14	.....5.40
Sharon,Pa. S3	.....4.325
S.Chicago,Ill. W14	...4.325
S.SanFrancisco(25) B3	5.075
SparrowsPoint,Md. B2	..4.325
Sterling(1) N15	.....4.325
Sterling,Ill. N15	.....4.425
Torrance,Calif. C11	....5.075
Warren,O. R2	.....4.325
Weirton,W.Va. W6	....4.325
Youngstown U5	.....4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	..7.50
Carnegie,Pa. S18	.....7.20
Fontana,Calif. K1	....8.85
Gary,Ind. U5	.....7.20
Ind.Harbor,Ind. Y1	....7.20
LosAngeles B3	.....8.40
Newport,Ky. N9	.....7.20
Sharon,Pa. S3	.....7.20
S.Chicago W14	.....7.20
Youngstown U5, Y1	....7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	....6.425
Conshohocken,Pa. A3	..6.425
Ecorse,Mich. G5	.....6.525
Fairfield,Ala. T2	.....6.425
Fontana,Calif. K1	....7.525
Gary,Ind. U5	.....6.425
Houston S5	.....6.675
Ind.Harbor,Ind. I-2, Y1	6.425
KansasCity,Mo. S5	....6.675
Lackawanna,N.Y. B2	..6.425
LosAngeles(25) B3	....7.175
Seattle(25) B3	.....7.425
Sharon,Pa. S3	.....6.425
S.SanFrancisco(25) B3	7.175
SparrowsPoint,Md. B2	..6.425
Warren,O. R2	.....6.425
Weirton,W.Va. W6	....6.425
Youngstown U5, Y1	..6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	..4.575

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	....6.25
Baltimore T6	.....6.25
Boston T6	.....6.80
Buffalo S40	.....6.25
Cleveland J5	.....6.25
Cleveland A7	.....6.25
Conshohocken,Pa. A3	...6.30
Dearborn,Mich. D3	....6.35
Detroit D2, M1, P20	...6.35
Dover,O. G6	.....6.25
Ecorse,Mich. G5	.....6.35
Follansbee,W.Va. F4	...6.25
Fontana,Calif. K1	....8.00
FranklinPark,Ill. T6	...6.35
Ind.Harbor,Ind. I-2	....6.35
Ind.Harbor,Ind. Y1	....6.25
Indianapolis C8	.....6.40
Lackawanna,N.Y. B2	...6.25
LosAngeles C1	*.....8.30*
NewBedford,Mass. R10	..6.70
NewBritain(10) S15	....6.25
NewCastle,Pa. B4, E5	..6.25
NewHaven,Conn. A7	....7.00
NewHaven,Conn. D2	...6.70
NewKensington,Pa. A6	..6.25
Pawtucket,R.I. R3	....6.90
Pawtucket,R.I. N8	....6.80
Pittsburgh J5	.....6.25
Portsmouth,O. P12	....6.25
Riverdale,Ill. A1	.....6.35
Rome,N.Y.(32) R6	....6.25
Sharon,Pa. S3	.....6.25
SparrowsPt.,Md. B2	....6.25
Trenton,N.J. R5	.....6.25
Wallingford,Conn. W2	...6.70
Warren,O. R2, T5	....6.25
Weirton,W.Va. W6	....6.25
Worcester,Mass. A7	....7.10
Youngstown Y1	.....6.25
Youngstown C8	.....6.25

STRIP, Cold-Rolled Alloy

Boston T6	.....13.80
Carnegie,Pa. S18	.....13.45
Cleveland A7	.....13.45
Dover,O. G6	.....13.45
FranklinPark,Ill. T6	..13.45
Harrison,N.J. C18	....13.45
Indianapolis C8	.....13.60
Pawtucket,R.I. N8	....13.80
Sharon,Pa. S3	.....13.45
Worcester,Mass. A7	..13.75
Youngstown C8	.....13.45

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7	.....9.10
Dearborn,Mich. D3	....9.20
Dover,O. G6	.....9.30
Ecorse,Mich. G5	.....9.20

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.30	9.25	10.80	12.95	15.65
Boston T6	7.55	9.25	10.80	12.95	15.65
Bristol,Conn. W1	...	...	10.80	12.95	15.65
Carnegie,Pa. S18	...	8.95	10.50	12.65	....
Cleveland A7	*7.10*	*9.05*	*10.60*	*12.75*	*15.45*
Cleveland C7	...	8.95	10.50	12.65	15.35
Dearborn,Mich. D3	7.10	9.05	10.60	....	....
Detroit D2	7.10	9.05	10.60	12.75	....
Dover,O. G6	7.00	8.95	10.50	12.65	15.35
Follansbee,W.Va. F4	7.00	8.95	10.50**	....	....
FranklinPark,Ill. T6	7.10	8.95	10.50	12.65	15.35
Harrison,N.J. C18	...	...	10.80	12.95	15.65
Indianapolis C8	7.15	9.10	10.50	12.65	15.35
NewBritain,Conn.(10) S15	7.00	8.95	10.50	12.65	15.35
NewCastle,Pa. B4, E5	7.00	8.95	10.50	12.65	....
NewHaven,Conn. D2	7.45	9.25	10.80	12.95	....
NewKensington,Pa. A6	7.00	8.95	10.50	....	....
NewYork W3	...	9.25	10.80	12.95	15.65
Pawtucket,R.I. N8	7.55	9.25	10.80	12.95	15.35
Riverdale,Ill. A1	7.10	8.95	10.50	12.65	15.35
Rome,N.Y.(32) R6	7.00	8.95	10.50	12.65	15.35
Sharon,Pa. S3	7.00	8.95	10.50	12.65	15.35
Trenton,N.J. R5	...	9.25	10.80	12.95	15.65
Wallingford,Conn. W2	7.45	9.25	10.80	12.95	15.65
Warren,O. T5	7.00	8.95	10.50	12.65	15.35
Weirton,W.Va. W6	7.00	8.95	10.50	12.65	15 35
Worcester,Mass. T6	7.55	9.25	10.80	12.95	15 65
Worcester,Mass. A7	*7.95*	*9.35*	*10.90*	*13.05*	*15.75*
Youngstown C8	7.00	8.95	10.50	12.65	15.35

**0.065 C. max.

Spring Steel (Tempered)

Bristol,Conn. W1	...	...	14.40	17.60	....
Buffalo, W12	...	...	14.40	....	....
FranklinPark,Ill. T6	...	...	14.90	18.10	21.50
Harrison,N.J. C18	...	...	14.40	17.60	21.00
NewYork W3	...	...	14.40	17 60	21 00
Trenton,N.J. R5	...	...	14.40	17.60	21.00
Worcester,Mass. T6	...	...	14.40	17.60	21.00
Worcester,Mass. W12	...	...	14.40	....	....
Worcester,Mass. A7	...	...	*14.50*	*17.70*	*21.10*
Youngstown C8	...	...	14.75	17.95	21.35

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10 95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. N12	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	10.70	11.70	12.60
GraniteCity,Ill. G4	8.80*	9.80*	10.40*	11.40*	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	...	...	10.10†	10.70†	11.70† 12.60†
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60
Zanesville,O. A10	...	10.10	10.70	11.70	12.60

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80§	13.35§	13.85§	14.85§

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.85	17.45	17.95	13.55§
Butler,Pa. A10	....	....	17.45	17.95	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	13.55
Warren,O. R2	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, ¾-cent higher.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	.....6.55

TIGHT COOPERAGE HOOP

Atlanta A11	.....5.05
Riverdale,Ill. A1	.....4.90
Sharon,Pa. S3	.....4.75
Youngstown U5	.....4.75

STRIP, Electrogalvanized

Cleveland A7	.....6.25*
Dover,O. G6	.....6.25*
Riverdale,Ill. A1	.....6.55*
Youngstown C8	.....6.25*
Warren,O. T5	.....6.25*
Warren,O. B9	.....6.45*
Weirton,W.Va. W6	....5.75*
Worcester,Mass. A7	...7.10*

*Plus galvanizing extras.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0
Aliquippa,Pa. J5	$7 90	$8.15	
Dravosburg Pa. U5	7 90	8.15	
Fairfield,Ala. T2	8.00	8.25	
FairlessHills,Pa. U5	8.00	8.25	
Gary,Ind. U5	7 90	8.15	
GraniteCity,Ill. G4	8.00	8.25	
IndianaHarbor,Ind. I-2, Y1	7 90	8.15	
Niles,O. R2	7.90	8.15	
Pittsburg,Calif. C11	8.65	8.90	
SparrowsPoint,Md. B2	8.00	8.25	
Weirton,W.Va. W6	7.90	8.15	
Yorkville,O. W10	7.90	8.15	

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	6.575	....
Niles,O. R2	7.075	7.275

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.20	$9.45
Dravosburg,Pa.U5	9.20	9.45
Fairfield,Ala. T2.	9.30	9.55
Fairless,Pa. U5..	9.30	9.55
Gary,Ind. U5	9.20	9.45
Ind.Har. I-2, Y1.	9.20	9.45
Pitts.,Calif. C11..	9.95	10.20
Sp.Pt.,Md. B2 ..	9.30	9.55
Weirton W.Va. W6	9.20	9.45
Yorkville,O. W10.	9.20	9.45

BLACK PLATE, (Base Box)

Aliquippa,Pa. J5	.....$7.00
Dravosburg,Pa. U5	....7.00
Fairfield,Ala. T2	.....7.10
FairlessHills,Pa. U5	....7.10
Gary,Ind. U5	.....7.00
GraniteCity,Ill. G4	....7.10
Ind.Harbor,Ind. I-2, Y1	7.00
Niles, O. R2	.....7.00
Pittsburg,Calif. C11	...7.75
SparrowsPoint,Md. B2	..
Warren,O. R2	.....
Weirton,W.Va. W6	...
Yorkville,O. W10	....

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	...
Gary,Ind. U5	.....
GraniteCity,Ill. G4	...
Ind.Harbor,Ind. Y1	...
Yorkville,O. W10	....

MANUFACTURING TERNES (Special Coated; Base

Dravosburg,Pa. U5	...
Gary,Ind. U5	.....

MANUFACTURING TERNES (Light Coated, 6 lb; Base

Yorkville,O. W10	.....

ROOFING SHORT TERNES (8 lb Coated; Base Bo

Gary,Ind. U5	.....

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	..6.25
Aliquippa,Pa. J5	.....6.25
Alton,Ill. L1	.....6.425
Atlanta A11	.....6.45
Bartonville,Ill. K4	....6.35
Buffalo W12	.....6.25
Chicago W13	.....6.25
Cleveland A7	.....6.25
Crawfordsville,Ind. M8	..6.35
Donora,Pa. A7	.....6.25
Duluth,Minn. A7	.....6.25
Fairfield,Ala. T2	.....6.25
Fostoria,O.(24) S1	....6.45
Houston S5	.....6.50
Jacksonville,Fla. M8	...6.77
Johnstown,Pa. B2	.....6.25
Joliet,Ill. A7	.....6.25
KansasCity,Mo. S5	....6.50
Kokomo,Ind. C16	.....6.35
LosAngeles B3	.....7.20
Minnequa,Colo. C10	....6.50
Monessen,Pa. P7	.....6.25
Newark 6-8 ga. I-1	....6.90
N.Tonawanda B11	....6.25
Palmer,Mass. W12	....6.55
Pittsburgh,Calif. C11	...7.20
Portsmouth,O. P12	....6.25
Rankin,Pa. A7	.....6.25
S Chicago,Ill. R2	.....6.25
S.SanFrancisco C10	....7.20
SparrowsPoint,Md. B2	..6.35
Sterling,Ill.(1) N15	....6.25
Sterling,Ill. N15	.....6.35
Struthers,O. Y1	.....6.25
Waukegan,Ill. A7	.....6.25
Worcester,Mass. A7	....6.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	.....7.90
Alton,Ill. L1	.....8.075
Bartonville,Ill. K4	.....8.00
Buffalo W12	.....7.90
Cleveland A7	.....7.90
Donora,Pa. A7	.....7.90
Duluth,Minn. A7	.....7.90
Fostoria,O. S1	.....7.95
Johnstown,Pa. B2	.....7.90
LosAngeles B3	.....8.85
Milbury,Mass.(12) N6	..8.20
Minnequa,Colo. C10	....8.15
Monessen,Pa. P16	.....7.90
Muncie,Ind. I-7	.....8.10
Palmer,Mass. W12	....8.20
Pittsburg,Calif. C11	...8.85
Portsmouth,O. P12	....7.90
Roebling,N.J. R5	.....8.20
S.Chicago,Ill. R2	.....7.90
S SanFrancisco C10	....8.85
SparrowsPt.,Md. B2	...8.00
Struthers,O. Y1	.....7.90
Trenton,N.J. A7	.....8.20
Waukegan,Ill. A7	.....7.90
Worcester A7,J4,T6,W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	.....7.60
Alton,Ill. L1	.....
Buffalo W12	.....
Cleveland A7	.....
Donora,Pa. A7	.....
Duluth,Minn. A7	.....
Johnstown,Pa. B2	.....
KansasCity,Mo. S5	....
LosAngeles B3	.....
Minnequa,Colo. C10	..
Monessen,Pa. P16	....
NewHaven,Conn. A7	..
Palmer,Mass. W12	...
Pittsburg,Calif. C11	..
Portsmouth,O. P12	...
Roebling,N.J. R5	....
S.Chicago,Ill. R2	....
S.SanFrancisco C10	..
SparrowsPoint,Md. B2	..
Sterling,Ill. N15	....
Struthers,O. Y1	.....
Trenton,N.J. A7	.....
Waukegan,Ill. A7	.....
Worcester,Mass. A7	....

WIRE, Fine & Weaving(8"

Alton,Ill. L1	.....
Bartonville,Ill. K4	....
Buffalo W12	.....
Chicago W13	.....
Cleveland A7	.....
Crawfordsville,Ind. M8	..
Fostoria,O. S1	.....
Jacksonville,Fla. M8	..
Johnstown,Pa. B2	....
Kokomo,Ind. C16	.....
Minnequa,Colo. C10	..
Monessen,Pa. P16	....
Muncie,Ind. I-7	.....
Palmer,Mass. W12	....
Roebling,N.J. R5	....
S.SanFrancisco C10	....
Waukegan,Ill. A7	.....
Worcester,Mass. A7,T6	..

WIRE, Gal'd ACSR for Co

Bartonville,Ill. K4	....
Buffalo W12	.....
Johnstown,Pa. B2	....
Minnequa,Colo. C10	..
Monessen,Pa. P16	....
Muncie,Ind. I-7	.....
Pittsburg,Calif. C11	..
Portsmouth,O. P12	...
Roebling,N.J. R5	....
SparrowsPt.,Md. B2	..

ROPE WIRE

Bartonville,Ill. K4	....
Buffalo W12	.....
Fostoria,O.(23) S1	....
Johnstown,Pa. B2	....
Monessen,Pa. P16	....
Muncie,Ind. I-7	.....
Palmer,Mass. W12	....
Portsmouth,O. P12	....
Roebling,N.J. R5	....
SparrowsPt. B2	.....
Struthers,O. Y1	.....
Worcester,Mass. J4	....

(A) Plow and Mild
add 0.25c for Improved

WIRE

(Continued)

RE, Tire Bead

rtonville, Ill. K4	14.15
nessen, Pa. P16	14.20
eblin, N.J. R5	14.35

RE, Cold-Rolled Flat

derson, Ind. G6	9.00
ltimore T6	9.30
ffalo W12	9.00
veland A7	9.00
wfordsville, Ind. M8	9.00
ver. O. G6	9.00
storia, O. S1	9.00
nklin Park, Ill. T6	9.10
komo, Ind. C16	9.00
ssillon, O. R8	9.00
lwaukee C23	9.20
nessen, Pa. P16	9.00
wtucket, R.I. N8	9.30
verdale, Ill. A1	9.10
me, N.Y. R6	9.00
enton, N.J. R5	9.30
rcester A7, T6, W12	9.30

ll, Stock

To Dealers & Mfrs. (7)	Col.
abamaCity, Ala. R2	152
qu'ppa, Pa. J5	152
anta A11	154
rtonville, Ill. K4	154
icago, Ill. W13	152
veland A9	157
wfordsville, Ind. M8	154
nora Pa. A7	152
luth, Minn. A7	152
rfield, Ala. T2	152
iveston, Tex. D7	157
uston, Tex. S5	157
nstown, Pa. B2	152
let, Ill. A7	152
nsasCity, Mo. S5	157
komo, Ind. C16	154
nnequa, Colo. C10	157
nessen Pa. P7	152
tsburg Calif. C11	171
nkin Pa. A7	152
hicago, Ill. R2	152
rrowsPt., Md. B2	154
rling, Ill. (1) N15	152
rcester, Mass. A7	158

LLS, CUT (100 lb keg)

To Dealers (33)	$9.05
nshohocken, Pa. A3	
eeling, W.Va. W10	9.05

APLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
quippa, Pa. J5	152
anta A11	154
rtonville, Ill. K4	154
wfordsville, Ind. M8	154
nora, Pa. A7	152
luth, Minn. A7	152
rfield Ala. T2	152
nstown, Pa. B2	152
let, Ill. A7	152
komo Ind. C16	154
nnequa Colo. C10	157
nessen Pa. P7	152
tsburg, Calif. C11	171
nkin Pa. A7	152
rrowsPt., Md. B2	154
rling, Ill. (1) N15	152
rcester, Mass. A7	158

WIRE, Automatic Baler
½ Ga.) (Per 97 lb Net Box)
Coil No. 3150

abamaCity, Ala. R2	$9.35
rtonville, Ill. K4	9.45
ffalo W12	9.35
wfordsville, Ind. M8	9.46
nora, Pa. A7	9.35
luth, Minn. A7	9.35
nstown, Pa. B2	9.35
let Ill. A7	9.35
komo, Ind. C16	9.45
Angeles B3	10.14
nnequa, Colo. C10	9 60
tsburg Calif. C11	10.43
hicago Ill. R2	9.35
rrowsPt., Md. B2	9.45
rling, Ill. N15	9.35

Coil No. 6500 Stand.

abamaCity, Ala. R2	$9.65
rtonville, Ill. K4	9.75
ffalo W12	9 60
wfordsville, Ind. M8	9.75
nora Pa. A7	9.65
luth, Minn. A7	9.65
nstown, Pa. B3	9 65
let, Ill. A7	9 65
komo, Ind. C16	9.75
Angeles B3	10 45
nnequa, Colo. C10	9.90
tsburg, Calif. C11	10.13
hicago Ill. R2	9.65
rrowsPt., Md. B2	9.75
rling, Ill. N15	9.65

Coil No. 6500 Interim

abamaCity Ala. R2	$9.70
rtonville Ill. K4	9.80
ffalo W12	9.70
Crawfordsville, Ind. M8	9.80
Donora, Pa. A7	9.70
Duluth, Minn. A7	9.70
Johnstown, Pa. B2	9.70
Joliet, Ill. A7	9.70
Kokomo, Ind. C16	9.80
LosAngeles B3	10 50
Minnequa, Colo. C10	9.95
Pittsburg, Calif. C11	10.50
S. Chicago, Ill. R2	9.70
SparrowsPt., Md. B2	9.80
Sterling, Ill. N15	9.70

WIRE, Barbed	Col.
AlabamaCity, Ala. R2	175**
Aliquippa J5	172§
Atlanta A11	181
Bartonville Ill. K4	181
Crawfordsville, Ind. M8	181
Donora, Pa. A7	175†
Duluth Minn. A7	175†
Fairfield, Ala. T2	175†
Houston Tex. S5	180†
Johnstown, Pa. B2	179*
Joliet, Ill. A7	175†
KansasCity, Mo. S5	180†
Kokomo, Ind. C16	177†
Minnequa, Colo. C10	180**
Monessen, Pa. P7	179*
Pittsburg, Calif. C11	195†
Rankin, Pa. A7	175†
S Chicago, Ill. R2	175**
S. SanFrancisco C10	195**
SparrowsPoint, Md. B2	181*
Sterling, Ill. (1) N15	179*

WOVEN Fence, 9-15 ga.	Col.
Ala City Ala. R2	162**
Ala. City, 17 ga. R2	241**
Ala. City, 18 ga. R2	251**
Aliq'ppa, Pa. 9-14½ga J5	165§
Atlanta A11	168
Bartonville, Ill. K4	168
Crawfordsville Ind. M8	168
Donora, Pa. A7	162†
Duluth, Minn. A7	162†
Fairfield, Ala. T2	162†
Houston, Tex. S5	167†
Johnstown Pa. (43) B2	166
Joliet, Ill. A7	162†
KansasCity, Mo. S5	167†
Kokomo Ind. C16	164†
Minnequa, Colo. C10	167**
Monessen, Pa. 9 ga. P17	166*
Pittsburg, Calif. C11	185†
Rankin Pa. A7	162†
S. Chicago Ill. R2	162**
Sterling, Ill. (1) N15	166*

Wire (16 Gage)	An'ld Stone	Galv.
Ala. City R2	14.50	16.05**
Bartonville K4	14 60	16.50
Buffalo W12	14.50	....
Cleveland A7	14.50	....
Crawf'dsville M8	14 60	16.50
Fostoria, O. S1	14.60	16.15†
Johnstown B2	14.15	16.40*
Kokomo C16	14.60	16.15†
Minnequa C10.	14.75	16.45**
Palmer Mass W12	14.50	16.05*
Pitts. Calif. C11	14.85	16.40†
S. Chicago R2.	14.50	16.05**
SparrowsPt. B2	14 60	16.50*
Sterling (1) N15	14.50	16.45††
Waukegan A7	14.50	16.05†
Worcester A7	14.80	....

WIRE, Merchant Quality (6 to 8 gage)	An'ld	Galv.
Ala. City, Ala. R2	7.40	7.80**
Aliquippa J5	7.40	7.925§
Atlanta A11	7.50	8.075
Bartonville (48) K4	7.50	8.075
Buffalo W12	7.40	8.80†
Cleveland A7	7.40	....
Crawfordsville M8	7.50	8.075
Donora, Pa. A7	7.40	7.80†
Duluth, Minn. A7	7.40	7.80†
Fairfield T2	7.40	7.80†
Houston, Tex. S5	7.65	8.05†
Jacks'ville, Fla. M8	7 90	8.475
Johnstown B2 (48)	7.40	7.975*
Joliet, Ill. A7	7.40	7.80†
KansasCity, Mo. S5	7.65	8.05†
Kokomo C16	7.50	7.90†
LosAngeles B3	8.35	8.925*
Minnequa C10	7.65	8.05**
Monessen P7 (48)	7.40	7.975*
Palmer, Mass. W12	7.70	8.10†
Pitts., Calif. C11	8.35	8.75†
Portsmouth, O. P12	7.40	....
Rankin A7	7.40	7.80†
S. Chicago R2	7.40	7.80**
S. SanFran. C10	8.35	8.75**
Spar'wsPt. B2 (48)	7.50	8.075*
Str'ling (1) (48) N15	7.40	8.00††
Struthers, O. (48) Y1	7.40	7.90†
Worcester, Mass. A7	7.70	....

*Based on 12.50c zinc; †5c zinc; §10c zinc; ‡Less than 10c zinc; **Subject to zinc equalization extras. ††13c zinc.

BALE TIES, Single Loop	Col.
AlabamaCity, Ala. R2	173
Atlanta A11	175
Bartonville, Ill. K4	175
Crawfordsville, Ind. M8	175
Donora, Pa. A7	173
Duluth, Minn. A7	173
Fairfield, Ala. T2	173
Joliet, Ill. A7	173
Houston S5	178
KansasCity, Mo. S5	178
Kokomo, Ind. C16	175
Minnequa, Colo. C10	178
S. Chicago R2	173
S. SanFran., Calif. C10	197
SparrowsPoint, Md. B2	175
Sterling, Ill. (1) N15	173

FENCE POSTS

	Col.
ChicagoHts., Ill. C2, I-2.	157
Duluth, Minn. A7	157
Franklin, Pa. F5	157
Huntington, W.Va. W7	157
Johnstown, Pa. B2	160
Marion, O. P11	157
Minnequa, Colo. C10	162
Moline, Ill. R2	162
S. Chicago, Ill. R2	157
Tonawanda, N.Y. B12	157
Williamsport, Pa. S19	160

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts

Full-Size Body (cut thread)	
†½" x 6" and smaller	61
Larger than ½" diam. and all diams. longer than 6"	55
Under-Size Body (rolled thread; not nutted): ½" x 6" and smaller.	61

Carriage, Machine & Lag Bolts, Hot Galvanized:

½" and smaller	42
Larger than ½" diam. and all diams. longer than 6"	32

†½" x 4" and smaller and shorter are not nutted.

Lag Bolts

All diams. & 6" and shorter	61
All diams. longer than 6"	55

Plow, Tap & Blank Bolts

½" x 6" and smaller.	61
Larger than ½" diam. and all diams. longer than 6"	55

Ribbed Neck, Carriage, Step, Elevator, Fitting-Up and Tire Bolts:

All sizes	61

STOVE BOLTS, SLOTTED (nuts not attached; bulk)

⅛" to ¼" diam. incl., 3" or shorter:	
25,000 to 199,999 pieces	61
200,000 or more pieces	64
5/16" to ½" diam. incl., 3" or shorter:	
15,000 to 99,999 pieces	61
100,000 or more pieces	64
Longer than 3", any diam.:	
5000 to 99,999 pieces.	61
100,000 or more pieces	64

RIVETS

F o b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.95

⅜-in. under..List less 32%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.06	20.42
1¼	13	....	24.94	20.45
1½	13	23.31	27.57	22.61
1¾	13	27.54	32.57	26.71
2	13	30.87	36.51	29.93
2¼	13	34.77	41.12	33.72
2¼	12	37.73	44.63	36.60
2½	12	41.57	49.16	40.31
2¾	12	45.00	53.22	43.65
3	12	47.99	56.76	46.55

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer, Pa. U5	4.725	4.625	4.675	5.65
Ensley, Ala. T2	4.725	4.625	....	5.65
Fairfield, Ala. T2	....	....	....	5.65
Gary, Ind. U5	4.725	....	....	....
Huntington, W.Va. W7	....	....	....	5.65
IndianaHarbor, Ind. I-2	4.725	4.625	4.675	....
Johnstown, Pa. B2	....	....	....	(16) 5.65
Lackawanna, N.Y. B2	4.725	4.625	....	5.65
Minnequa, Colo. C10	4.725	4.625	....	6.15
Steelton, Pa. B2	4.725	4.625	....	....
Williamsport, Pa. S19	....	....	....	5.65

TIE PLATES

Fairfield, Ala. T2	5.625
Gary, Ind. U5	5.625
Ind. Harbor, Ind. I-2	5.625
Lackawanna, N.Y. B2	5.625
Minnequa, Colo. C10	5.625
Seattle B3	5.775
Steelton, Pa. B2	5.625
Torrance, Calif. C11	5.775

TRACK BOLTS (20) Treated

Cleveland R2	12.40
KansasCity, Mo. S5	12.40
Lebanon, Pa. B2	12.40
Minnequa, Colo. C10	12.40
Pittsburgh O3, P14	12.40
Seattle B3	12.90

AXLES

Ind. Harbor, Ind. S13	7.25
Johnstown, Pa. B2	7.25

JOINT BARS

Bessemer, Pa. U5	5.825
Fairfield, Ala. T2	5.825
Ind. Harbor, Ind. I-2	5.825
Joliet, Ill. U5	5.825
Lackawanna, N.Y. B2	5.825
Minnequa, Colo. C10	5.825
Steelton, Pa. B2	5.825

SCREW SPIKES

Cleveland R2	11.90
Pittsburgh O3	11.90

STANDARD TRACK SPIKES

Fairfield, Ala. T2	7.90
Ind. Harbor, Ind. I-2, Y1	7.90
KansasCity, Mo. S5	7.90
Lebanon, Pa. B2	7.90
Minnequa, Colo. C10	7.90
Pittsburgh J5	7.90
Seattle B3	8.40
S. Chicago, Ill. R2	7.90
Struthers, O. Y1	7.90
Youngstown R2	7.90

METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+% Fe, annealed.	9.25
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	8.25
Minus 20 mesh	9.00
Swedish, c.i.f. Camden, N. J., c.l. in bags.	9.50
Domestic (Swedish), f.o.b. Riverton, N.J., in bags	9.50
Canadian, fo.o.b. Shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	34.00
Unannealed (99+% Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh).	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns.	83.00-148.00
Aluminum: Atomized, 500 lb. drum frght. allowed	
Carlots	34.50
Ton lots	36.50
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	38.00-50.00†
Bronze, 5000-lb lots	61.25-64.50†
Copper:	
Electrolytic	56.75
Reduced	56.75
Lead	22.80
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	58.75-61.50†
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc, 5000-lb lots	18.75-32.50‡
Tungsten Melting grade, 99% 60 to 200 mesh:	Dollars
1000 lb and over	4.50
Less than 1000 lb	4.65
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni, **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago Base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5 80c.
(15) 3/8" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Mild plow, 10.55c.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill and 0.45c for carbon, add 0.40c for alloy and 0.45c H.S.-L.A.
(31) Widths over 5/8-in.; 6.90c for widths 5/8-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6-7 Ga.

SEAMLESS STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.1
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk
Aliquippa, Pa. J5	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5
Ambridge, Pa. N2	6.5	..	10.5	...	13	...	14.5	...	14.5	...	14	...	16.5
Lorain, O. N3	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5
Youngstown Y1	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Youngstown R2	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5

BUTTWELD STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.2
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk
Aliquippa, Pa. J5	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5
Alton, Ill. L1	...	...	....	....	....	....	15.5	+1.75	18.5	2.25	21	5.75	23.5
Benwood, W. Va. W10	16.5	+12	7.25	+18.25	+1.75	+26.25	17.5	0.25	20.5	4.75	23	7.75	25.5
Butler, Pa. F6	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...
Etna, Pa. N2	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5
Fairless Hills, Pa. N3	...	...	....	....	....	....	15.5	+1.75	18.5	2.75	21	5.75	23.5
Fontana, Calif. K1	...	...	....	....	....	....	6	+11.25	9	+7.25	11.5	+3.75	14
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	16.5	+0.75	19.5	3.25	22	6.75	24.5
Lorain, O. N3	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5
Sharon, Pa. S4	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5
Sparrows Pt., Md. B2	15.5	+13	7	+18.5	+1.5	+26	15.5	+1.75	18.5	2.25	21	5.75	23.5
Youngstown R2, Y1	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5
Wheatland, Pa. W9	17.5	+11	9	+16.5	0.5	+24	17.5	0.25	20.5	4.25	23	7.75	25.5

Size—Inches	1½		2		2½		3		3½		4
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk
Aliquippa, Pa. J5	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....
Alton, Ill. L1	24	8	24.5	8.5	26	8.75	26	8.75	....	...	....
Benwood, W. Va. W10	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5
Etna, Pa. N2	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5
Fairless Hills, Pa. N3	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5
Fontana, Calif. K1	14.5	+1.5	15	+1	16.5	+0.75	16.5	+0.75	7	+10.75	7
Ind. Harbor, Ind. Y1	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5
Lorain, O. N3	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....
Sharon, Pa. M6	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....
Sparrows Pt., Md. B2	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5
Youngstown R2, Y1	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5
Wheatland, Pa. W9	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5

*Galvanized pipe discounts based on current price of zinc (13.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. Bars; H.R. Strip	Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
201	17.00	21.50	....	....	31.00	....	....	42.25	39.00
202	18.25	24.00	31.00	36.25	33.50	36.75	38.75	42.50	42.50
301	17.75	22.25	....	36.75	32.00	38.00	....	44.25	41.00
302	19.00	24.75	32.00	37.25	34.50	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	41.00	....	....	....
304	20.25	26.00	33.75	39.00	37.25	40.25	43.00	47.25	47.25
304L	....	....	38.75	44.00	42.25	45.25	48.00	52.25	52.25
305	21.75	28.25	....	39.50	40.25	40.25	43.50	50.25	50.25
308	22.00	29.00	38.50	44.25	41.25	45.50	49.75	52.00	52.00
309	29.50	38.25	46.75	53.50	53.50	54.75	58.25	67.00	67.00
309S	31.50	41.00	51.00	59.00	58.50	60.25	63.75	74.00	74.00
310	37.25	48.00	62.25	72.25	68.50	73.50	75.25	78.75	78.75
314	....	....	....	....	....	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	60.75	64.00	68.25	68.25
316L	....	....	56.25	64.75	63.25	65.75	69.25	73.25	73.25
317	37.25	48.25	62.75	72.75	73.50	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	45.25	49.25	54.25	54.25
18-8CbTa	29.25	38.00	45.75	52.25	53.25	53.50	58.00	66.50	66.50
403	....	....	28.75	32.75	....	34.00	36.25	....	44.00
405	17.50	23.00	26.75	31.00	32.25	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	30.50	31.75	36.25	36.25
416	....	....	....	26.00	30.00	....	31.00	....	....
420	23.50	30.25	31.00	36.00	37.75	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	31.00	32.25	36.75	36.75
430F	....	....	26.50	30.50	....	31.50	....	....	....
431	16.00	20.50	26.50	30.50	29.75	31.50	33.00	38.00	38.00
446	....	....	35.50	40.50	53.25	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co., Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

Stainless:	Plates—Carbon Base 10%	Plates—Carbon Base 20%	Sh Carbo 20
302	....	....	3
304	30.30	36.05	3
304-L	32.30	37.95	.
310	41.30	47.00	.
316	35.50	41.40	4
316-L	40.00	46.10	.
316-CB	41.15	48.45	.
321	32.00	37.75	3
347	34.40	41.40	4
405	25.80	33.35	.
410	25.30	32.85	.
430	25.30	32.85	.
Inconel	49.45	65.45	.
Nickel	41.05	55.65	.
Nickel, Low Carbon	43.25	60.05	.
Monel	*43.95*	*59.55*	.
Copper*	....	....	4

	Strip, Carbon Bas—Cold Rolled— 10%	Both
Copper*	30.00	3

*Deoxidized. Production points: Stainless-clad s New Castle, Ind. I-4; stainless-clad plates, Claymont C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and ington, Pa. J3; nickel, inconel, monel-clad plates, C ville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$
Regular Carbon	0.275	5% Cr Hot Work	0.430
Extra Carbon	0.330	W-Cr Hot Work	....
Special Carbon	0.390	V-Cr Hot Work	....
Oil Hardening	0.430	Hi-Carbon-Cr	.....

Grade by Analysis (%)

W	Cr	V	Co	Mo	$
20.25	4.25	1.6	12.25	...	.....
18.25	4.25	1	4.75	...	..... 2.305
18	4	2	9	...	..... 2.675-
18	4	2	....	...	.....
18	4	1	....	...	.....
13.75	3.75	2	5	...	.....
13.5	4	3	....	...	.....
9	3.5	..	....	...	.....
6	4	2	....	5	.....
6	4	3	....	6	.....
1.5	4	1	....	8.5	.....

Tool steel producers include: A4, A8, B2, B8, C4 C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

g Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
ningham District				
amaCity,Ala. R2	54.50	55.00‡	....	....
ningham R2	54.50	55.00‡	....	....
ningham U6	....	55.00‡	59.00	....
dward,Ala. W15	54.50	55.00‡	59.00	....
ncinnati, deld.	....	62.70	....	....
falo District				
falo H1, R2	58.50	59.00	59.50	60.00
awanda,N.Y. W12	58.50	59.00	59.50	60.00
onawanda,N.Y. T9	....	59.00	59.50	60.00
ston, deld.	69.15	69.65	70.15	....
chester,N.Y. deld.	61.52	62.02	62.52	....
racuse,N.Y. deld.	62.62	63.12	63.62	....
cago District				
cago I-3	58.50	59.00	59.00	59.50
y,Ind. U5	58.50	....	59.00	....
icago R2	58.50	....	59.00	....
icago,Ill. Y1	58.50	59.00	59.00	59.50
icago,Ill. U5, W14	58.50	....	59.00	59.50
ilwaukee, deld.	60.67	61.17	61.17	61.67
uskegon,Mich. deld.	....	65.30	65.30	....
eland District				
eland A7, R2	58.50	59.00	59.00	59.50
kron,O., deld.	61.25	61.75	61.75	62.25
ain,O. N3	58.50	....	....	59.50
-Atlantic District				
hlehem,Pa. B2	60.50	61.00	61.50	62.00
ewYork, deld.	....	64.78	65.28	....
ewark, deld.	63.52	64.02	64.52	65.02
lsboro,Pa. B10	60.50	61.00	61.50	62.00
ster,Pa. P14	60.50	61.00	61.50	....
hiladelphia, deld.	62.16	62.66	63.16	....
lton,Pa. B2	60.50	61.00	61.50	62.00
deland,Pa. A3	60.50	61.00	61.50	62.00
hiladelphia, deld.	62.16	62.66	63.16	63.66
y,N.Y. R2	60.50	61.00	61.50	62.00
sburgh District				
illeIsland,Pa. P6	58.50	59.00	59.00	....
ittsburgh (N&S sides), Aliquippa, deld.	....	60.37	60.37	60.87
cKeesRocks, deld.	....	60.04	60.04	60.54
awrenceville,Homestead, Wilmerding, Monaca, deld.	....	60.66	60.66	61.16
erona,Trafford, deld.	60.69	61.19	61.19	61.69
rackenridge, deld.	60.95	61.45	61.45	61.95
semer,Pa. U5	58.50	....	59.00	59.50
rton,Rankin,S.Duquesne,Pa. U5	58.50	....	....	....
Keesport,Pa. N3	58.50	....	....	59.50
land,Pa. C18	58.50	....	....	....

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Youngstown District				
Hubbard,O. Y1	....	....	59.00	....
Sharpsville,Pa. S6	58.50	....	59.00	59.50
Youngstown Y1	....	....	59.00	59.50
Youngstown U5	58.50	....	....	59.50
Mansfield,O., deld.	63.40	....	63.90	64.40
Duluth I-3	58.50	59.00	59.00	59.50
Erie,Pa. I-3	58.50	59.00	59.00	59.50
Everett,Mass. E1	62.00	62.50	63.00	....
Fontana,Calif. K1	64.50	65.00	....	....
Geneva,Utah C11	58.50	59.00	....	....
GraniteCity,Ill. G4	60.40	60.90	61.40	....
Ironton,Utah C11	58.50	59.00	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	60.50	61.00	61.50	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	58.50	59.00	59.00	59.50
Cincinnati, deld.	64.26	64.76	....	....

*Phos. 0.51-0.75%; $56. Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	$67.50
Buffalo H1	68.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls, N.Y. P15	$85.50
Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2)	90.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	93.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$72.50
Steelton,Pa. B2 (Phos. 0.035% max)	66.50
Philadelphia, deld.	70.05
Troy,N.Y. R2 (Phos. 0.035% max)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50

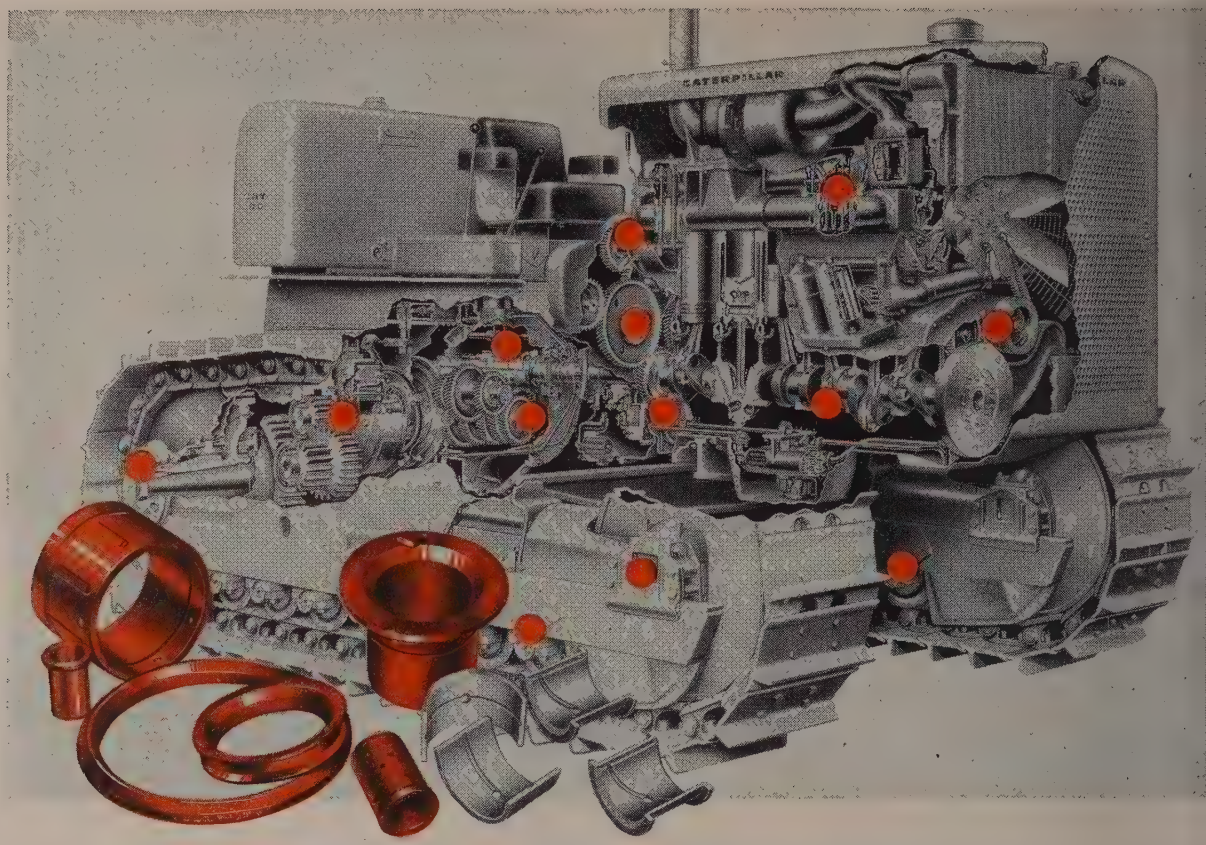
/arehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 25 cents per 100 lb except: Buffalo, Cleveland, Erie, 30 cents; Moline, Norfolk, Richmond, Wa:hington, 20 cents; Birmingham, Chattanooga, Jackson, 15 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
nta	7.14	8.20	8.87	....	7.40	...	7.42	9.39	....	7.63	7.49	9.48
timore	7.03	8.32	8.37	....	7.65	...	7.61	8.62[3]	13.44	7.93	7.21	8.87
ningham	6.80	7.90	8.85	....	7.06	...	7.08	9.35	....	7.28	6.99	9.10
ton	7.70	8.81	10.27	45.67	7.96	...	7.83	9.53	14.45	8.13	7.89	9.36
falo	6.80	8.05	9.77	....	7.15	...	7.10	7.90	13.10	7.40	7.15	8.70
ttanooga	6.95	8.10	8.60	....	7.20	...	7.20	9.18	....	7.45	7.25	9.05
cago	6.80	8.09	8.50	49.05	7.06	...	7.08	7.75	12.85	7.28	6.99	8.46
cinnati	6.92	8.08	8.90	46.10	7.30	...	7.32	8.05	13.09	7.75	7.28	8.71
veland	6.80	8.09	8.85	49.16	7.16	...	7.14	7.85	12.91	7.61	7.16	8.63
roit	6.99	8.28	8.78	43.50	7.34	...	7.36	8.04	13.05	7.75	7.27	8.65
, Pa.	6.80	7.90	8.85	....	7.15	...	7.08	7.85	....	7.40	7.15	8.63
ston	7.85	8.75	10.49	....	8.15	...	8.25	9.85	14.00	8.20	7.80	9.20
kson, Miss.	7.10	8.20	9.20	....	7.40	...	7.40	9.44	....	7.60	7.45	9.30
Angeles	8.05	10.00	11.00	....	8.35	...	8.05	11.25	14.25	8.30	8.05	10.25
waukee	6.89	8.18	8.59	....	7.15	...	7.17	7.94	12.94	7.45	7.08	8.55
ine, Ill.	7.15	8.44	8.85	....	7.41	...	7.43	8.10	....	7.63	7.34	...
v York	7.46	8.68	9.44	44.95	8.07	...	7.96	9.48	13.28	7.99	7.76	9.19
folk, Va.	7.25	...	...	....	7.65	...	7.65	9.50	....	7.95	7.45	8.95
iadelphia	7.14	8.42	9.35	45.98	7.67	9.02	7.64	8.46	13.16	7.74	7.37	8.69**
sburgh	6.80	8.09	9.20	49.00	7.16	...	7.08	7.85	12.85	7.28	6.99	8.46
tland, Oreg.	7.80	8.80	10.65	....	8.00	...	7.95	12.20	15.00	7.85	7.75	9.60
hmond, Va.	7.00	...	9.47	....	7.65	...	7.70	8.85	....	7.95	7.20	9.10
Louis	7.09	8.38	9.19	43.89	7.35	...	7.37	8.14	13.14	7.68	7.28	8.75
Paul	7.46	8.59	9.16	....	7.72	...	7.74	8.51	13.51	7.94	7.65	9.12
Francisco	8.10	9.65	10.15	51.65	8.35	...	8.05	11.20	14.25[3]	8.25	8.05	10.25
ttle	8.55	10.40	10.80	54.00	8.65	...	8.35	11.70	14.60	8.30	8.20	10.10
kane	8.55	11.00[7]	10.80	....	9.05	...	8.35	11.80	15.35	8.30	8.20	10.60
shington	7.50	8.79	7.97	....	8.12	...	8.08	9.09	....	8.40	7.68	9.34

Prices do not include gage extras; †prices include gage and coating extras (based on 12.50-cent zinc), except in Birmingham (coating extra ex-ded); ‡includes 35-cent special bar quality extras; **⅛-in. and heavier; ††as annealed; §§under ½-in.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; -rolled products on West Coast, 2000 to 9999 lb; [2]—500 to 9999 lb; [3]—400 to 999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; 1500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over.



Dependable Johnson Bearings

Help Give Long Life To Big Cat Machinery

Engine bearings and bearings in track rollers and other components play a big role in the ability of Caterpillar Diesel Tractors to give long, satisfactory performance on tough jobs.

Caterpillar Tractor Co., manufacturers of the big yellow, earth moving rigs you see at every hand, makes certain that each part has the quality and stamina to give trouble-free service.

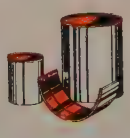
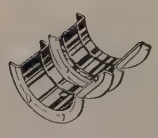
The ability of Cat equipment to handle difficult assignments depends in part on bearings obtained from Johnson Bronze Company of New Castle, Pa., which supplies a wide variety of the bearings used throughout Caterpillar products.

Dependable Johnson bearings—made of aluminum on steel, babbitt on steel, cast bronze, bronze on steel, and sintered bronze powder (Ledaloyl)—help Caterpillar meet its triple objective of: 1. durability, 2. bigger pay loads, and 3. longer life. Johnson also offers Caterpillar sound engineering help, has a complete line, maintains uniform high quality and consistently meets Caterpillar's specifications.

This is a typical example of the service Johnson gives many manufacturers in all industry by supplying them with many types of bearings for a wide variety of applications—from automobiles to sound recorders—from automatic washers to machine tools—to name but a few.

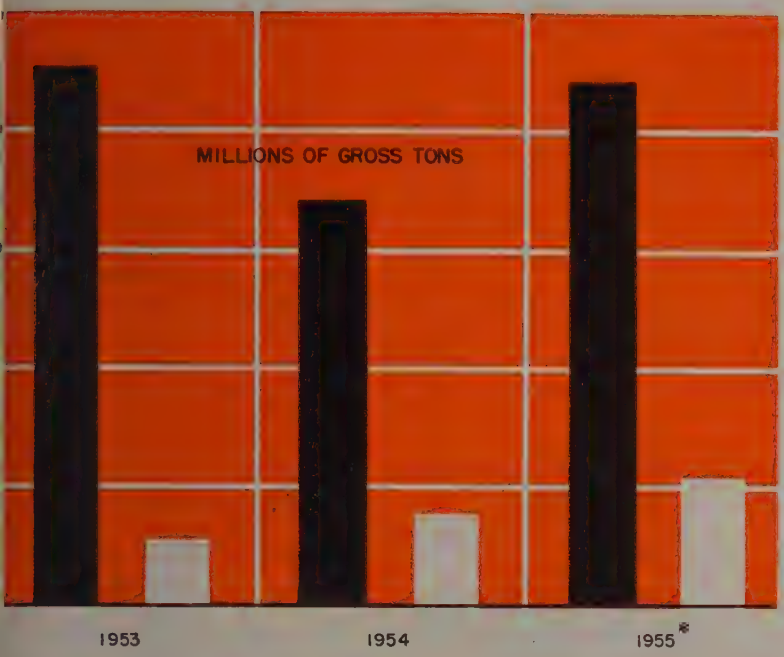
To enjoy the dependability and economy of Johnson bearings in your products, write for information on how Johnson engineers will work with you to make a better product at lower cost. Johnson Bronze Company, 550 S. Mill Street, New Castle, Pennsylvania.

Johnson Bearings

LEDALOYL • ALUMINUM ON STEEL • BRONZE ON STEEL • STEEL AND BABBITT • CAST BRON

(powder metallurgy)



ecord steel production uses less domestic ore as . . .

ron Ore Imports Go Up

■ **Lake Superior Iron Ore Consumption**
Lake Superior Iron Ore Association

□ **Iron Ore Imports**
Bureau of Census

* Estimated by STEEL

HE FIGURES tell the story. Ore ıports are on the rise; use of Lake ıperior iron ore is beginning to slip. This year, imports will be more an four times what they were in 47, about double what they were st two years ago.

Consumption Drops—In 1953, when 1.6 million net tons of steel were ade, consumption of Lake Superior e in U. S. furnaces reached 76.6 illion gross tons by the end of Oc- ber. This year, with a record pro- ıction of 116.3 million tons ex- ıcted, only 69.5 million tons of Lake ıperior ore were used during the me period.

In 1953, nearly 95 million gross ns of ore were brought down the kes. This year, with nearly 5 mil- n more net tons of steel being pro- ıced, ore shipments were slightly er 87 million tons as of last Mon- y morning. Little more will be ipped. The last cargo of ore for e Pittsburgh Steamship Division, S. Steel Corp., cleared the Soo ocks last Monday afternoon.

Imports — In August, 2,870,371 oss tons of ore were brought into e U. S. to set a record.

Imports as of the end of August were 14.4 million tons; almost as much as the 15.8 million tons brought in during recordbreaking 1954.

Canadian shipments (5.5 million tons) are nearly 2 million tons higher than last year's. Venezuelan shipments, 4.9 million tons, are close to last year's total of 5.2 million tons. And shipments from Brazil are way ahead of last year's.

Three countries (Sweden, Chile and Peru) may not ship as much this year as they did last year. Point of interest: Ore prices in these countries have gone up—from 40 to 84 cents a ton.

Prices in the other big exporting countries are less than they were a year ago. Liberian ore costs 76 cents a ton less this year. Its imports will rise by about 165,000 tons. Brazilian ore is 54 cents less, and ore from Venezuela is 49 cents cheaper.

Ore and Scrap—Scrap consumption this year is almost identical with 1953's. For the first nine months this year scrap consumption was about 0.5 per cent less than in 1953, while steel production was up 272,000 net tons. So foreign ore must make up for the drop in the amount of Lake Superior ore available and the small amount needed because of the decreased percentage of scrap used.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 181 & 182

"We can't take another 1-ton order for sheet in the first quarter," says the sales manager for one of the smaller firms in the Pittsburgh district. His remark is true of most producers who say there is no chance for a greater allotment of steel to customers in early 1956. Supply is expected to grow more critical as some producers will block out one month in the first quarter to reduce unfilled orders. In the case of the sales manager mentioned above, his firm will accept no March orders.

While some manufacturers of household appliances are seasonally less active, the fact doesn't lessen their demand for steel. They are striving to build up stocks which are below normal in practically all instances. All will receive far less than they have requested for first quarter, and they are not optimistic as to what they will receive in the second quarter. Conversion tonnage is becoming more prominent, but negotiations are on a limited basis.

Steel Bars . . .

Bar Prices, Page 180

Producers continue to turn away substantial inquiries for hot-rolled carbon steel bars. Carry-overs from this quarter probably will cancel out four to six weeks of production in the first quarter, although producers are making some progress in reducing the order backlog by trimming customer allotments.

Despite their sold-up condition through the first quarter, producers say consumers are still refusing to take "no" for an answer to their inquiries and are pressing hard for additional tonnages.

Predictions of a 10-to-15-percent increase in demand for machinery steel in 1956 are circulating in the Pittsburgh district. Demand for bars from this industry is increasing and is expected to continue to grow through June of next year.

In hot-rolled alloy and cold-finished bars, the situation is different. Notwithstanding improved demand, mills can accept tonnage for fairly early delivery; in January on certain of the larger sizes of plain hot-rolled alloy.

An exception applies to nickel-bearing steel bars and other products where the nickel content runs 0.75

per cent or more. Where ratings apply, producers supply their customers without question once agreement is reached with regard to deliveries. Where ratings don't apply, the mills fight shy, although sometimes allocating a little where the customer is one of many years standing.

Tubular Goods . . .

Tubular Goods Prices, Page 184

Pittsburgh—Distributors are placing orders for January merchant pipe shipments; that month will probably see mills operating at capacity. Elsewhere in tubular products, mills are generally booked solidly through the first quarter.

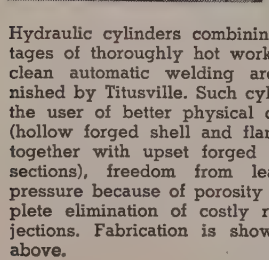
Oil country tubing is in strongest demand. Some customers are trying to line up their supply for next summer. Purchasing agents have called on steelmakers with April and May requests, but most producers are taking first quarter orders only.

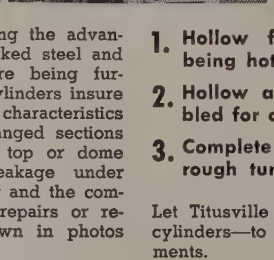
In the Pacific Northwest, demand for cast iron pipe is dragging. Steel and other types are offering strong opposition, many bids inviting alternatives. Renewed interest in cast iron pipe for spring delivery is confidently expected within 30 days.

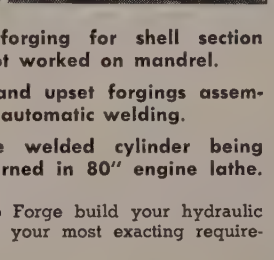
Need Large Hydraulic Cylinders?

BUILT TO REQUIRED SIZES AND TOLERANCES BY

TITUSVILLE FORGE







Hydraulic cylinders combining the advantages of thoroughly hot worked steel and clean automatic welding are being furnished by Titusville. Such cylinders insure the user of better physical characteristics (hollow forged shell and flanged sections together with upset forged top or dome sections), freedom from leakage under pressure because of porosity and the complete elimination of costly repairs or rejections. Fabrication is shown in photos above.

1. Hollow forging for shell section being hot worked on mandrel.
2. Hollow and upset forgings assembled for automatic welding.
3. Complete welded cylinder being rough turned in 80" engine lathe.

Let Titusville Forge build your hydraulic cylinders—to your most exacting requirements.

Struthers Wells

STRUTHERS WELLS CORPORATION

TITUSVILLE FORGE DIVISION

TITUSVILLE, PA.

PLANTS AT TITUSVILLE, PA., and WARREN, PA.

Offices in Principal Cities

Connors Steel Raises Prices

H. K. Porter Company Inc.'s C nors Steel Division upped prices cent a pound, effective as of Nov. The increase is less than the adva in the cost of scrap, company cials say. The new schedule these prices: Carbon structu shapes, 5.10c per pound; hot-ro strip, 4.825c; carbon steel merch bars, 5.15c; and reinforcing b 5.15c, all on a Birmingham base

Wire . . .

Wire Prices, Pages 182 & 183

Demand for manufacturers v products continues heavy, assur capacity production for weeks come. A substantial amount of p sure comes from makers of fasten springs and other specialties requi by the automotive industry.

Inquiry for merchant products declined seasonally, although prod tion is being maintained at a h level for inventory building aga heavy ordering by distributors early spring.

Plates . .

Plate Prices, Page 180

Plate inquiry looms heavier t ever, especially with the railroads deavoring to boost car buying. C 1 railroads, faced with severe shortages, plan to place 87,500 frei cars during the final two months this year. These are in addition 57,000 on order by these railro Nov. 1. This 145,000-car purch program will require an estima outlay of $1.25 billion. In addit railroads plan to reduce their p centage of bad order cars from to 4 per cent. Plate requireme will be especially heavy.

Steel plate buyers are forced turn to warehouses in increas numbers as mill allotments for f quarter are lean. Plate shortage held up construction work but no the extent that scarcity of structu shapes affects these projects.

Within 60 days, plate requireme in the Seattle area will incre sharply as several important t contracts are pending. Plate sh ages are becoming more critical that area. Two principal suppli state their allotments have been reduced they are hard pressed to previous commitments. No Japan plate, which was offered freely in Pacific Northwest two years ago on the market.

A. M. Byers Co., Pittsburgh, ports a growing use of wrought i

te and pipe for protection of oil
ll casing at offshore points in the
lf Coast area. Wrought iron, with
anticorrosive qualities, protects
casing in areas near the water-
e where attack is worst.

tainless Steel . . .

Stainless Steel Prices, Page 184

Pittsburgh—Stainless steel sales
nagers, returning from talks in
ashington, report little possibility
increased allotments of nickel. Sup-
is expected to be critical through
rly months of next year, if not be-
nd. Production of nickel-bearing
inless grades is curtailed by the
ortage, but steelmakers are recom-
ending substitution of other alloy
ades where possible. Their efforts
e partially successful and produc-
n rates remain high.

ad-Steel Plate Prices Rise

Due to an increase in the price of
onel, Lukens Steel Co. advanced
se prices of its Monel-clad plate
c. 1. Under new schedules, 5 per
nt cladding is 36.15c; 10 per cent,
.95c; 15 per cent, 51.75c; 20 per
nt, 59.55c; 25 per cent, 69.55c; 30
r cent, 79.55c; 35 per cent, 89.55c;
per cent, 99.55c; 45 per cent,
.0955; 50 per cent, $1.1955.

einforcing Bars . . .

Reinforcing Bar Prices, Page 180

More winter construction than ever
fore is keeping the pressure on
einforcing steel products, partic-
arly bars. While the bulk of orders
suppliers' books are for large proj-
ts, there is a big volume of small
bs pressing for tonnage. For the
ost part, they are in the commer-
al or municipal category. In the
tter group are a great number of
hool buildings.

Prospects for 1956 are highly prom-
ing for a large volume of orders.

tructural Shapes . . .

Structural Shape Prices, Page 180

Structural fabricators are still con-
onted with far more tonnage than
ey can handle. Whatever seasonal
tup there may be is still far from
inging demand into balance with
oduction.

Shop order backlogs are more ex-
nded and are still increasing; some
e booked ten months ahead. Con-
ibuting to this situation is a con-
nued scarcity of plain material.
ew, if any, fabricators have enough
eel to keep them going at normal
apacity. Structural shops are get-
ng tonnages ordered as far back as September. The advanced delivery situation is causing some builders to defer action in coming into the market, pending a further check on likely cost trends and financing requirements. However, considerable work is still under active negotiation.

Prestressed concrete beams (estimated tonnage: 5000 tons) for small bridges are edging out some structural steel tonnage for flood replacements in the Northeast. Most prestressed beams, including reinforcing strand, are bought direct, but several bridges being estimated will be bought by contractors. For short spans, prestressed beams have a price advantage.

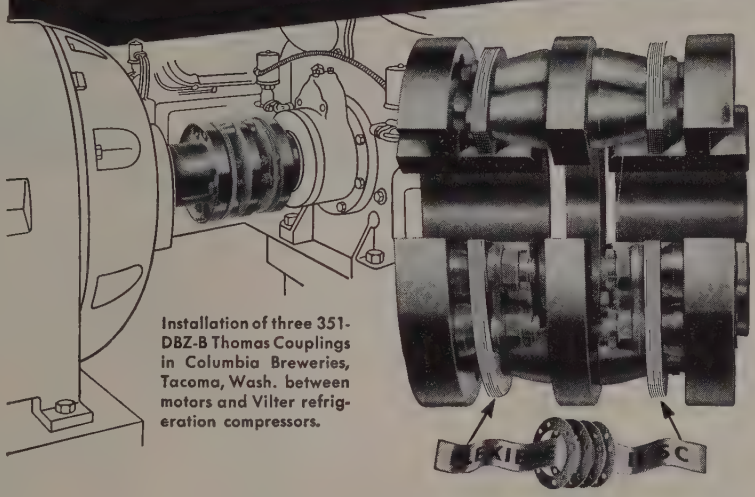
Warehouse . . .

Warehouse Prices, Page 185

Warehouse steel business continues brisk and would be even more active if distributors had more tonnage to sell, especially structurals and plate. As mills continue to key their flat-rolled production to automotive requirements, it's still difficult for warehouses to secure sheet and strip.

Distributors are growing extremely short in their supplies and believe first-quarter conditions will be even

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!

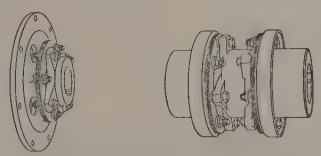


Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

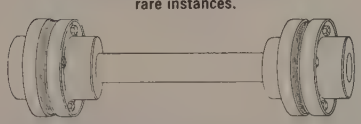
Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



THOMAS

Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

SIZE CONTROL'S SIZE-LAPPER-

The most accurate size-generating machine at the machine tool show.

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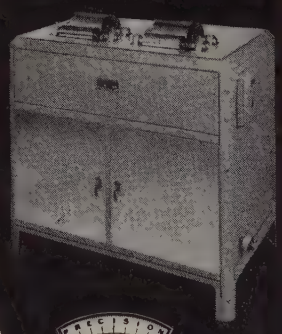

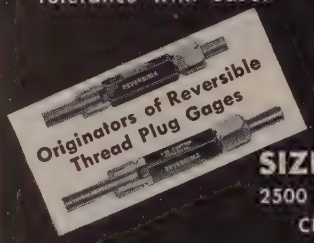

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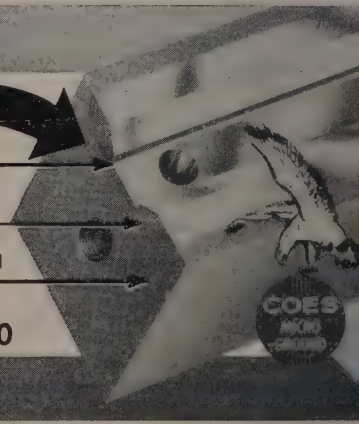


COES KNIFE COMPANY, Worcester, Mass.- Est. 1830

ter. Current deliveries to distrib-
s are one to two months behind
edule, and carry-overs limit open-
for new orders for delivery in
first quarter. An exception is
Los Angeles district where stocks
above normal in some products.
ome increase is noted in imports,
ch are running around 5000 to
) tons monthly at Philadelphia.

mifinished Steel . . .

Semifinished Prices, Page 180

Wheeling Steel Corp. is maintain-
steel production at near-capacity
es at its Steubenville, Mingo Junc-
, Yorkville, O., and Benwood,
Va. plants. All six of the com-
y's blast furnaces are operating.
jor steel departments operated
anksgiving Day because of heavy
mmitments to customers.

RUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

) tons, tunnel section, Fitzgerald express-
ay, Boston, to Bethlehem Steel Co., Beth-
hem, Pa.; V. Barletta Co., Boston, gen-
al contractor; tonnage in addition to tun-
el frames and reinforcing to same fabrica-
r.

tons, Pennsylvania Railroad bridge, Beaver
ounty Pennsylvania, to American Bridge Di-
ision, United States Steel Corp., Pitts-
urgh.

tons, galvanized transmission towers for
onneville Power Administration, to Beth-
hem Pacific Coast Steel Corp., Seattle, low
t $154,756, f.o.b. Seattle.

tons, structurals and bars, engineering
uilding, Southwestern Louisiana Institute,
afayette, La., to Mississippi Steel & Iron
o., Jackson, Miss.; R. J. Jones & Sons,
lexandria, La., general contractor; rein-
orcing, Ceco Steel Products Corp., New
rleans.

tons, addition, St. Joseph hospital, Read-
ng, Pa., to Reading Metalcraft Co., that
ity.

tons, structurals and bars, regional high
chool, Deerfield, Mass., to Haarmann Steel
o., Holyoke, Mass.; O. D. Purington,
rovidence, R. I., general contractor; re-
nforcing, Plantations Steel Co., Providence,
. I.

) tons, structurals and bars, school, Arling-
on, Mass., to Groisser & Shlager Iron
Works, Somerville, Mass.; Vappi & Co. Inc.,
Cambridge, Mass., general contractor; re-
nforcing, Concrete Steel Co., Boston.

) tons, high school, Wallingford, Conn., to
Standard Structural Steel Co., Hartford,
Conn.; the Wadhams & May Co., Hartford,
Conn., general contractor.

) tons, Locksa river bridge, Idaho, for
Forest Reserve, to Gate City Iron Works,
Omaha, Nebr.

) tons, students union building, University
of New Hampshire, Durham, N. H., to
Groisser & Shlager Iron Works, Somerville,
Mass.; J. A. Volpe Construction Co., Malden,
Mass., general contractor.

) tons, state school, Portland, Me., to Ban-
croft & Martin Rolling Mills Co., South
Portland, Me.; Consolidated Constructions
Inc., Portland, Me., general contractor.

STRUCTURAL STEEL PENDING

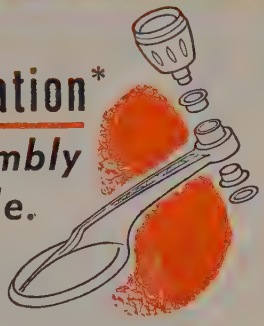
00 tons, Ft. Pitt bridge, Pittsburgh; plans
scheduled to be brought out by the state of
Pennsylvania in January for bidding.

55 tons, bridge, North-South freeway, Provi-
dence river, Providence, R. I.; bids Dec. 14,
state, Division of Purchases, Providence;
also 1260 tons, reinforcing, and 89,178 linear
ft foundation piles.

00 tons or more, hangar and preflight fa-
cilities, Larson Field, Washington state;
Boeing Airplane Co., bid call for Dec. 23

(*Please turn to page* 194)

...that's what
AEL Packaged-Automation*
achieved for the assembly of this window handle.



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4 workers + AEL = 6,000 units per hour @ 1/10¢ each

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- **Submit firm proposal to supply automatic equipment at a *fixed price*, guaranteed to perform in accordance with specifications**
- ***Design and build* complete automated unit or system**
- **Run test for client before delivery**

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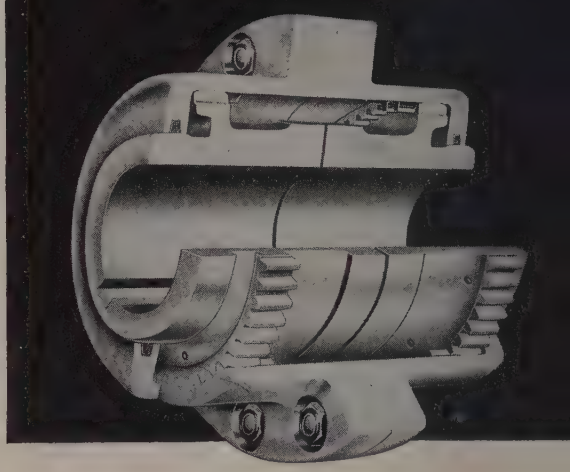
DAVENPORT, IOWA

POOLE



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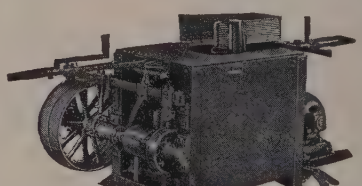

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urrent Ferroalloy Quotations

MANGANESE ALLOYS

egeleisen: Carlot, per gross ton, Palmerton, 21-23% Mn, $90.50; 19-21% Mn, 1-3% $88; 16-19% Mn, $86.

ndard Ferromanganese: (Mn 74-76%, C 7% rox.) Base price per net ton $190, Clairton, quesne, Johnstown and Sheridan, Pa.; Alloy, Va.; Ashtabula, Marietta, Philo, O.; Sheffd, Ala.; Portland, Oreg., and Tacoma, sh. Add or subtract $2.00 for each 1% or ction thereof of contained manganese over or under 74%, respectively.

n 79-81%). Lump $198 per net ton, f.o.b. aconda or Great Falls, Mont. Add $2.60 for h 1% above 81%; subtract $2.60 for each below 76%, fractions in proportion to rest 0.1%.

v-Carbon Ferromanganese, Regular Grade: n 85-90%). Carload, lump, bulk, max. 7% C, 29.95c per lb of contained Mn, carl packed 30.7c, ton lots 31.8c, less ton . Delivered. Deduct 1.5c for max 0.15% rade from above prices, 3c for max 0.30% 3.5c for max 0.50% C, and 6.5c for max % C—max 7% Si. **Special Grade:** (Mn % min, C 0.07% max, P 0.06% max). d 2.05c to the above prices. Spot, add 0.25c.

dium-Carbon Ferromanganese: (Mn 80-85%, 1.25-1.5%, Si 1.5% max). Carload, lump, k 21.85c per lb of contained Mn, packed, load 22.9c, ton lot 24.5c, less ton 25.7c. ivered. Spot, add 0.25c.

nganese Metal: 2" x D (Mn 95.5% min, Fe max, Si 1% max, C 0.2% max): Carl, lump, bulk, 45c per lb of metal; packed, 75c; ton lot 47.25c; less ton lots 49.25c. ivered. Spot, add 2c.

ctrolytic Manganese Metal: Min carload. ; 2000 lb to min carload, 32c; 250 lb to 9 lb 34c. Premium for hydrogen-removed al, 0.75c per lb. Prices are f.o.b. cars. oxville, Tenn., freight allowed to St. Louis to any point east of Mississippi; or f.o.b. rietta, O., freight allowed.

comanganese: (Mn 65-68%). Contract, p, bulk 1.50% C grade, 18-20% Si, 11.2c lb of alloy. Packed, c.l. 12.2c, ton 12.65c. ton 13.65c, f.o.b. Alloy, W. Va., Ashtaa, O., Marietta, O., Sheffield, Ala., Portd, Oreg. For 2% C grade, Si 15-17%, de t 0.2c from above prices. For 3% C grade. 12-14.5%, deduct 0.4c from above prices. t, add 0.25c.

TITANIUM ALLOYS

rotitanium, Low-Carbon: (Ti 20-25%, Al % max, Si 4% max, C 0.10% max). ntract, ton lots 2" x D, $1.50 per lb of tained Ti; less ton $1.55. (Ti 38-43%, Al max, Si 4% max, C 0.10% max). Ton $1.35, less ton $1.37 f.o.b. Niagara Falls. ., freight allowed to St. Louis. Spot, 5c.

rotitanium, High-Carbon; (Ti 15-18%, C %). Contract $177 per ton, f.o.b. Niara Falls, N. Y., freight allowed to destinaas east of Mississippi river and north of timore and St. Louis.

rotitanium, Medium-Carbon: (Ti 17-21%, C 5%). Contract $195 per ton, f.o.b. Niara Falls, N. Y., freight not exceeding St. is rate allowed.

CHROMIUM ALLOYS

h-Carbon Ferrochrome: Contract, c.l., p, bulk 26.25c per lb of contained Cr; c.l. ked 27.5c, ton lot 29.25c, less ton 30.65c. ivered. Spot, add 0.25c.

v-Carbon Ferrochrome: (Cr 67-71%). Con-t, carload, lump, bulk, C 0.025% max mplex) 31.75c per lb contained Cr, 0.02 38.50c, 0.03% max 38c, 0.06% max 0c, 0.1% max 36c, 0.15% max 35.75c, % max 35.50c, 0.5% max 35.25c, 1.0% 34c, 1.5% max 33.85c, 2.0% max 33.75c. lot, add 3.1c, less ton add 4.8. Carload ked add 1.45c. Delivered. Spot, add 0.25c.

ndry Ferrochrome, High-Carbon: (Cr 62-%, C 5-7%, Si 7-10%). Contract, c.l. 8 M x bulk 27.4c per lb contained Cr. Packed 28.7c, ton 30.5c, less ton 32c. Delivered. t, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.2% min, Fe 0.2 max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.28. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5. freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.75c per lb of contained Si. Packed, c.l. 13.85c, ton lot 15.3c, less ton 16.95c. F.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lots, 18c: less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07 max Ca). C.l. lump, bulk, 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx, 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lots packed 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c, per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D. $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 21.5c per lb of alloy, carload packed 22.95c, ton lot 25.25c, less ton 26.75c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅜ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.95 per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.1c per lb of briquet, c.l. packed, pallets 12.3c, bags 13.1c; 3000 lb to c.l., pallets 13.5; 2000 lb to c.l., bags, 14.3c, less ton 15.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.7c per lb of briquet, c.l. packed, pallets, 12.9c; bags 13.7c, 3000 lb to c.l., pallets, 14.1c; 2000 lb to c.l., bags, 14.9c; less ton 15.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract carload, bulk 6.75c per lb of briquet; packed, pallets, 6.95c; bags, 7.75c; 3000 lb to c.l., pallets, 8.55c; 2000 lb to c.l. bags 9.35c; less ton 10.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.9c. Packed, pallets 7.1c; bags 7.9c; 3000 lb to c.l. pallets 8.7c; 2000 to c.l. bags 9.5c; less ton 10.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½" x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb or alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 16.50c. Packed c.l. 17.50c, 2000 lb to c.l. 18.50c, less than 2000 lb 19c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.46 in all sizes except powdered which is $1.57; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa.; $1.25 in cans; in bags, $1.24, f.o.b. Langeloth, Pa.; $1.24, Washington, Pa.

(*Concluded from page* 191)

postponed; new date unstated, probably in January.

1000 tons, five hangars and other construction, Elmendorf Air Base, Alaska; bids to U. S. Engineer, Anchorage, Alaska, Dec. 14.

980 tons, state bridge, Berks county, Pennsylvania; bids Dec. 22.

565 tons, including 335 tons, wide flange, navy, General Stores Supply Office, Philadelphia; bids Dec. 5.

330 tons, state bridge, Philadelphia county, Pennsylvania; bids Dec. 16.

300 tons, tees, grade M, Navy, General Stores Supply Office, Philadelphia.

300 tons, pumping plant addition and other construction, Hanford Works; Morrison-Knudsen Co. Inc., Seattle, low at $1,869,500.

230 tons three-span continuous WF beam bridge, Ferrisburg, Vt.; bids Dec. 16, Montpelier, Vt.

200 tons, Army bulk supply warehouse, Ladd Air Base, Alaska; S. S. Mullen Inc., Seattle, low and awarded at $1,357,000.

167 tons, state bridge work, Union and Somerset counties, New Jersey; bids Dec. 13; also 180 tons of reinforcing steel.

120 tons, two-span steel bridge, Goffstown branch, Boston & Maine Railroad, Manchester, N. H.; bids Dec. 8, Concord, N. H.

100 tons, angles, Raritan arsenal, Metuchen, N. J.; bids Dec. 9.

REINFORCING BARS . . .

REINFORCING BARS PLACED

615 tons, Morrison street bridge piers, Portland, Oreg., to Soule Steel Co., Portland; Manson Construction & Engineering Co., Seattle, general contractor.

535 tons, Washington state bridge, Capitol Lake, to Bethlehem Pacific Coast Steel Corp., Seattle; MacRae Bros., Seattle, low at $425,469, general contractor.

350 tons, science building, Louisiana Polytechnic Institute, Ruston, La., to Contractors Material Co. Inc., Jackson, Miss.; G. E. Bass & Co., Jackson, general contractor.

280 tons, building, state hospital, Monson, Mass., to Joseph T. Ryerson & Son Inc., Boston; L. & R. Construction Co., Medford, Mass., general contractor.

240 tons, Idaho state bridge, Priest river, to Bethlehem Pacific Coast Steel Corp., Seattle.

190 tons, student union building, University of New Hampshire, Durham, N. H., to Joseph T. Ryerson & Son Inc., Boston; J. A. Volpe Construction Co., Malden, Mass., general contractor.

170 tons, high school, Wallingford, Conn., to Scherer Steel Co., Hartford, Conn.; the Wadhams & May Co., Hartford, general contractor.

REINFORCING BARS PENDING

850 tons, state bridge, Philadelphia county, Pennsylvania; bids Dec. 16.

200 tons, state bridge work, Berks county, Pennsylvania; bids Dec. 22.

180 tons, state bridge work, Union and Somerset counties, New Jersey, bids Dec. 13; also 167 tons of structural steel.

109 tons, flume construction, Selah Irrigation District, Naches, Wash.; Cherf Bros. & Sandkey, Ephrata, Wash., low at $97,629.

PLATES . . .

PLATES PENDING

950 tons, three bulk storage tanks, 25,000-bbl each, King Salmon, Alaska; bids opened in September; no award yet by U. S. Engineer.

135 tons, elevated steel water tank, New Town No. 1, St. Lawrence power project; bids Dec. 6, Toronto, Canada.

100 tons (mostly ¼-in.), Letterkenny Ordnance Depot, Chambersburg, Pa.; bids Dec. 7.

PIPE . . .

CAST IRON PIPE PLACED

102 tons, Salem, Oreg., system expansion, to U. S. Pipe & Foundry Co., Seattle.

90 tons, 1558 ft of 20 in., Seattle district installation, to Pacific States Cast Iron Pipe Co., Seattle.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Canadian National, 35 diesel units, to eral Motors Diesel Ltd., Hamilton, On

LOCOMOTIVES PENDING

Northern Pacific, 79 diesel locomotive contemplated.

RAILROAD CARS PLACED

Clinchfield, 50 seventy-ton covered hoppe and 10 loader-equipped boxcars, to Pu Standard Car Mfg. Co., Chicago.

Denver & Rio Grande Western, 100 fif boxcars and 100 fifty-ton flatcars to Industries Inc., New York, and 25 se ton covered hopper cars to Pullman-Sta Car Mfg. Co., Chicago.

Minneapolis, Northfield & Southern, two ton boxcars to Pullman-Standard Car Co., Chicago.

Missouri Pacific, 1500 fifty-ton boxcars, t shops, De Soto, Mo.

Reading, 400 fifty-ton boxcars to ACF tries Inc., New York; in addition to and 500 gondolas and 500 hoppers re placed with Bethlehem Steel Co., Beth Pa., the railroad is now inquiring fo freight cars.

St. Louis-San Francisco, 2000 freight 1700 to the Pullman-Standard Car Mfg Chicago, and the remainder to the rail own shops.

Union Pacific, 2000 freight cars to co shops. List comprises 1300 fifty-ton cars of various types, 4000 seventy-to ered hopper cars and 300 seventy-ton cars.

Wabash, 100 seventy-ton covered hoppe to Pullman-Standard Car Mfg. Co., Ch

Western Maryland, 300 seventy-ton coal cars, to Bethlehem Steel Co., Beth Pa., and 50 fifty-ton flatcars to the ville Steel Car Co., Greenville, Pa.

RAILROAD CARS PENDING

Reading, 1900 freight cars, comprising hopper cars and 400 gondolas; bids these are in addition to 1400 placed re

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Ores

Lake Superior Iron Ore

Prices effective for the 1955 shipping season, ross ton, 51.50% iron natural, rail of vessel, wer lake ports)

ld range bessemer	$10.40
ld range nonbessemer	10.25
esabi bessemer	10.25
esabi nonbessemer	10.10
pen-hearth lump	11.25
igh phosphorus	10.00

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

oundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

wedish basic, 60-68%	20.00
. African hematite (spot)	nom. 18.00-20.00
razilian iron ore, 68-69% (spot)	24.00-26.00

Tungsten Ore

Net ton unit, before duty

oreign, wolframite, good commercial quality	$30.00-$31.00
omestic, scheelite, mine	63.00

Manganese Ore

n 48%, nearby, 95c-$1.05 per long ton unit, l.f. U. S. ports, duty for buyer's account; -47%, 75c-80c.	

Chrome Ore

ross ton, f.o.b. cars New York, Philadelia, Baltimore, Charleston, S. C., plus ocean eight differential for delivery to Portland, eg., Tacoma, Wash.	

Indian and African

% 2.8:1	nom. $45.00-$50.00
% 3:1	42.00-44.00
% no ratio	34.00

South African Transvaal

% no ratio	$19.00-$20.00
% no ratio	32.00

Domestic

Rail nearest seller	
% 3:1	$39.00

Molybdenum

iphide concentrate, per lb of Mo content, mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

-60%	$3.60-$3.85
-65%	3.85-4.00

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills omestic	31.00

Refractories

Fire Clay Brick (per 1000)

gh-Heat Duty: Ashland, Grahn, Hayward, tchins, Haldeman, Olive Hill, Ky., Athens, oup, Tex., Beech Creek, Clearfield, Curwensle, Lock Haven, Lumber, Orviston, West catur, Pa., Bessemer, Ala., Farber, Mexico, Louis, Vandalia, Mo., Ironton, Oak Hill, rral, Portsmouth, O., Ottawa, Ill., Stevens ttery, Ga., $122; Salina, Pa., $127; Niles, $133.

per-Duty: St. Louis, $150.

Silica Brick (per 1000)

ndard: Alexandria, Claysburg, Mt. Union, roul, Pa., Ensley, Ala., Portsmouth, O., wston, Pa., $128; Warren, Niles, O., Hays, ., $133; Morrisville, Pa., $131.50; E. Chigo, Ind. Joliet, Rockdale, Ill., $138; Lehigh, ah, $144; Los Angeles, $151.

per Duty: Hays, Sproul, Hawston, Pa., rren, Windham, O., Athens, Tex., $145; rrisville, Pa., Niles, O., $148; Joliet, Ill., 51; Curtner, Calif., $163.

Semisilica Brick (per 1000)

arfield, Pa., $139; Philadelphia, $124; Woodge, N. J., $122.

Insulating Fire Brick (per 1000)

00° *F:* Massillon, O., $178.50; Clearfield, ., $213; Augusta, Ga., Beaver Falls, Zelople, Pa., Mexico, Mo., $206; Vandalia, Mo., 4.10; Portsmouth, O., $207.50; Bessemer, ., $212.80.

Ladle Brick (per 1000)

y Pressed: Alsey, Ill., Chester, New Cumberd, W. Va., Freeport, Johnstown, Merrill tion, Pa., Mexico, Mo., $88.50; Wellsville, $92.50; Clearfield, Pa., Portsmouth, O. .

High-Alumina Brick (per 1000)

Per Cent: Clearfield, Pa., St. Louis, Mexi- Mo., $194; Danville, Ill., $197; Philadela, $201

Per Cent: St. Louis, Mexico, Vandalia, Mo., arfield, Pa., $241; Danville, Ill., $244; iladelphia, $248.

Per Cent: St. Louis, Mexico, Vandalia, Mo., 9; Danville, Ill., $281; Clearfield, Pa., iladelphia, $286.

Sleeves (per 1000)

esdale, Johnstown, Bridgeburg, Pa., $157; arfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

esdale, Pa., $253.70; Johnstown, Pa. 9.20, Clearfield, Pa., $259 40; St. Louis, 9.45; Bridgeburg, Pa., $286.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk, ½-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅜-in. grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.25-$14.00
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$25.50
Camden, N. J., ovens	25.00
Everett Mass., ovens	
New England, deld.	*27.05
Chicago, ovens	25.75
Chicago, deld.	27.25
Terre Haute, Ind., ovens	25.50
Milwaukee, ovens	26.25
Indianapolis, ovens	25.50
Portsmouth, O., ovens	24.75
Cincinnati, deld.	27.34
Painesville, O., ovens	26.25
Cleveland, deld.	28.18
Birmingham, ovens	24.40
Cincinnati, deld.	29.33
Buffalo, ovens	25.75
Buffalo, deld.	27.00
Lone Star, Tex., ovens	19.50
Neville Island, Pa., ovens	25.00
Philadelphia, ovens	25.00
Swedeland, Pa., ovens	25.00
St. Paul, ovens	25.00
Detroit, ovens	26.25
Detroit, deld.	27.25
Pontiac, deld.	27.81
Saginaw, deld.	29.33

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulphate	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $25.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length	Per 100 lb
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25

CARBON

8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

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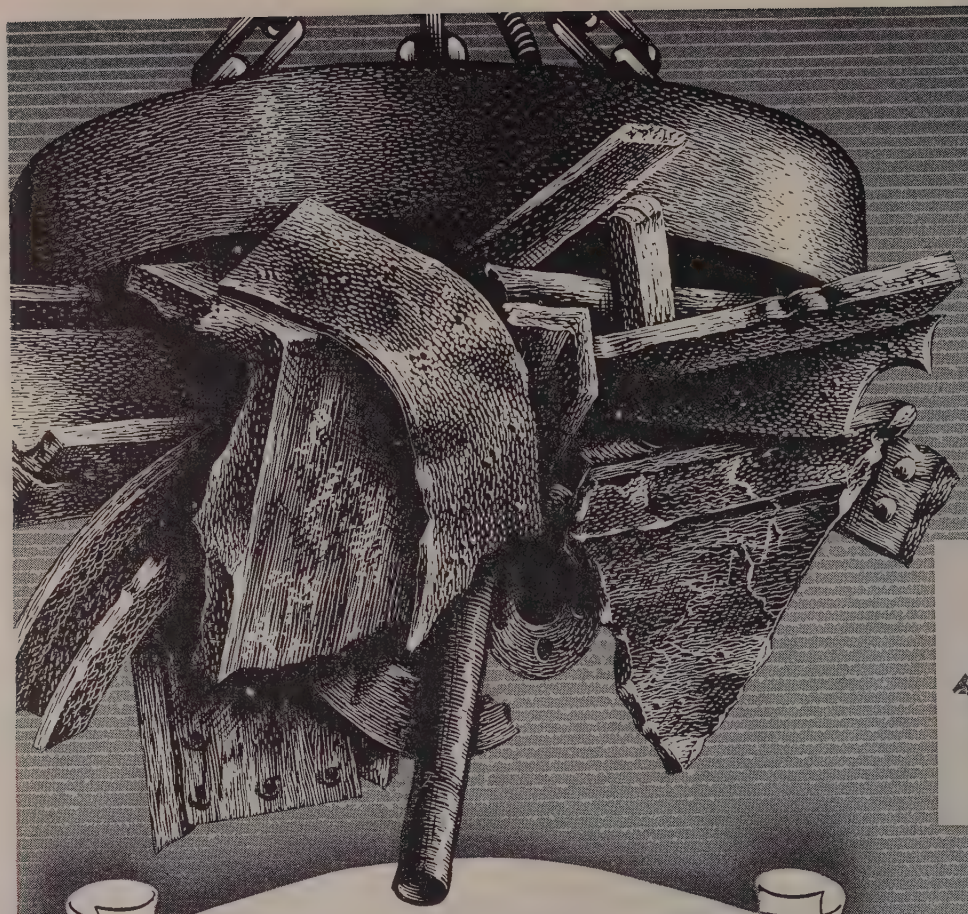

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EXPORTS-IMPORTS **LIVINGSTON & SOUTHARD, INC.** 99 Park Ave., New York, N. Y. *Cable Address:* **FORENT**

rap . . .

Scrap Prices, Page 198

hicago—The upward pressure in lmaking scrap continues. Several jor items have advanced another a ton to make the second jump in weeks. Involved are No. 1 and eavy melting, No. 1 factory bun-, No. 1 dealer bundles, No. 1 rail-d heavy melting, rerolling rails electric furnace grades.

o far, blast furnace grades have ed to strengthen, and only slight vard adjustments are evident in ndry grades.

ubfreezing weather and snow in Midwest are hampering collec- and movement of scrap. This uld prove to be a bullish factor. ot production is close to full ca-ity and future schedules aim to p it so, thus giving assurance of vy demand for scrap.

leveland — Scrap prices jumped rply higher here last week. Main-reflecting a purchase in the Valley one of the major mills, steelmak- grades here rose to $49-$50. In ition to this movement, scrap n local factory operations, includ- Fisher Body, brought prices in ess of quoted levels.

oungstown—The iron and steel scrap market here is displaying a strong undertone, with prices of top-grade material moving higher. There was a decided absence of buying on the part of the large scrap consumers until midweek. Holders of scrap seem determined to hang on for more than early offering prices. Normally, this is the season when the big Valley producers would be accumulating scrap for winter inventories; this year, their inventories are large, as are those of the major scrap suppliers.

One feature that is affecting the Youngstown scrap market is the lowered rate of bessemer steel operations, coupled with the high quality Labrador-Quebec ore that is coming into this district. Mills which normally charge 50-50 hot metal and scrap into their open hearths are charging up to 55 per cent hot metal, 10 per cent cold pig and 35 per cent scrap. Mills also are receiving a large tonnage of scrap in reciprocal deals with their customers.

New York—Reflecting continued strong demand, scrap brokers have advanced their buying prices on practically all grades. The market: $43-$44 on No. 1 heavy melting and No. 1 bundles; $38-$39, No. 2 heavy melting; $33-$34, No. 2 bundles; $22-$23, machine shop turnings; $23-$24, mixed borings and turnings; $25-$26, short shovel turnings; $44-$45, low phos structurals and plate.

Brokers have increased buying prices on No. 1 cupola to $38-$39, on heavy breakable to $41-$42. In stainless steel, 18-8 sheets, clips and solids are higher at $300-$310.

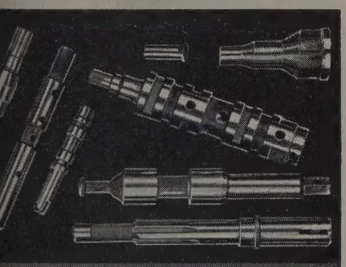
Pittsburgh—Dullness in the market for heavy melting steel continues. Even the customary rumors about impending purchases have fallen off. Mills are using a higher percentage of pig iron in their mix to offset the high scrap cost. Activity in surrounding areas continues brisk, maintaining prices on steelmaking grades at present levels.

Scarcity of 18-8 stainless steel grades leads to much scrambling among users, with prices ranging from $325 to $340 a ton for bundles and solids.

Philadelphia—Further increases in cast material feature the scrap market here. No. 1 cupola is higher at $46-$47, delivered; malleable, $61.50; heavy breakable cast, $49; and drop broken machinery, $53.50-$54. The increase in heavy breakable amounts to $2 a ton.

In the steel grades, machine shop turnings and mixed borings and turnings are higher at $31-$32, delivered; short shovel turnings, $34; and heavy

(*Please turn to page* 200)



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HEAT TREATING as an INDEX

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CINTI

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as repor
STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 30	$47.00
Nov. 23	46.33
Oct. Avg.	45.17
Nov. 1954	33.33
Nov. 1950	41.33

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*46.00-47.00*
No. 2 heavy melting	*41.00-42.00*
No. 1 bundles	*46.00-47.00*
No. 2 bundles	*37.00-38.00*
No. 1 busheling	*46.00-47.00*
Machine shop turnings	30.00-31.00
Mixed borings, turnings	30.00-31.00
Short shovel turnings	33.00-34.00
Cast iron borings	33.00-34.00
Cut structurals, 3 ft lengths	49.00-50.00
Heavy turnings	42.00-43.00
Punchings & plate scrap	49.00-50.00
Electric furnace bundles	48.00-49.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Charging box cast	42.00-43.00
Heavy breakable cast	42.00-43.00
Unstripped motor blocks	30.00-31.00
No. 1 machinery cast	*52.00-53.00*

Railroad Scrap

No. 1 R.R. heavy melt.	49.00-50.00
Rails, 2 ft and under	60.00-61.00
Rails, 18 in. and under	61.00-62.00
Rails, random lengths	56.00-57.00
Railroad specialties	54.00-55.00

Stainless Steel Scrap

18-8 bundles & solids	*325.00-340.00*
18-8 turnings	*210.00-220.00*
430 bundles & solids	100.00-110.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	*49.00-50.00*
No. 2 heavy melting	40.00-41.00
No. 1 bundles	*49.00-50.00*
No. 2 bundles	35.00-36.00
No. 1 busheling	*49.00-50.00*
Machine shop turnings	*25.00-26.00*
Mixed borings, turnings	*29.00-30.00*
Short shovel turnings	*29.00-30.00*
Cast iron borings	*29.00-30.00*
Low phos.	*49.00-50.00*
Cut structural plates 2 ft and under	*52.00-53.00*
Alloy free, short shovel turnings	*34.00-35.00*
Electric furnace bundles	*49.00-50.00*

Cast Iron Grades

No. 1 cupola	*49.00-50.00*
Charging box cast	*42.00-43.00*
Stove plate	*47.00-48.00*
Heavy breakable cast	*38.00-39.00*
Unstripped motor blocks	*30.00-31.00*
Brake shoes	*36.00-37.00*
Clean auto cast	*49.00-50.00*
Burnt cast	*38.00-39.00*
Drop broken machinery	*51.00-52.00*

Railroad Scrap

No. 1 R.R. heavy melt	*49.00-50.00*
R.R. malleable	*54.00-55.00*
Rails, 2 ft and under	*63.00-64.00*
Rails, 18 in. and under	*64.00-65.00*
Rails, random lengths	*59.00-60.00*
Cast steel	*51.00-52.00*
Railroad specialties	*55.00-56.00*
Uncut tires	*51.00-52.00*
Angles, splice bars	*59.00-60.00*
Rails, rerolling	*64.00-65.00*

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	*320.00-330.00*
18-8 turnings	*190.00-200.00*
430 clips, bundles, solids	90.00-100.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	*52.00-53.00*
No. 2 heavy melting	*40.00-41.00*
No. 1 bundles	*52.00-53.00*
No. 2 bundles	*36.00-37.00*
No. 1 busheling	*52.00-53.00*
Machine shop turnings	*29.00-30.00*
Short shovel turnings	*34.00-35.00*
Cast iron borings	29.00-30.00
Low phos.	*52.00-53.00*
Electric furnace bundles	47.50-48.50

Railroad Scrap

No. 1 R.R. heavy melt	*52.00-53.00*

CHICAGO

No. 1 heavy melting	*45.00-48.00*
No. 2 heavy melting	*36.00-37.00*
No. 1 factory bundles	*48.00-49.00*
No. 1 dealer bundles	*44.00-45.00*
No. 2 bundles	*35.00-36.00*
No. 1 busheling	*45.00-48.00*
Machine shop turnings	27.00-28.00
Mixed borings, turnings	29.00-30.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Cut structurals, 3 ft	*50.00-51.00*
Punchings & plate scrap	*51.00-52.00*

Cast Iron Grades

No. 1 cupola	*49.00-50.00*
Stove plate	*40.00-41.00*
Unstripped motor blocks	*37.00-38.00*
Clean auto cast	*53.00-54.00*
Drop broken machinery	*53.00-54.00*

Railroad Scrap

No. 1 R.R. heavy melt	*50.00-51.00*
R.R. malleable	*58.00-59.00*
Rails, 2 ft and under	*63.00-64.00*
Rails, 18 in. and under	*64.00-65.00*
Angles, splice bars	*60.00-61.00*
Rails, rerolling	*69.00-70.00*

Stainless Steel Scrap

18-8 bundles & solids	320.00-335.00
18-8 turnings	225.00-235.00
430 bundles & solids	100.00-105.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*41.00*
No. 2 heavy melting	*32.00*
No. 1 bundles	*41.00*
No. 2 bundles	*29.00*
No. 1 busheling	*41.00*
Machine shop turnings	21.00
Mixed borings, turnings	22.00
Short shovel turnings	24.00
Punchings & plate scrap	*50.00*

Cast Iron Grades

No. 1 cupola	*42.00*
Charging box cast	*36.00*
Stove plate	*34.00*
Heavy breakable	*35.00*
Unstripped motor blocks	22.00
Clean auto cast	*45.00*
Malleable	*36.00*

BIRMINGHAM

No. 1 heavy melting	40.00-41.00
No. 2 heavy melting	35.00-36.00
No. 1 bundles	38.00-39.00
No. 2 bundles	28.00-29.00
No. 1 busheling	38.00-39.00
Cast iron borings	17.00-18.00
Short shovel turnings	28.00-29.00
Machine shop turnings	27.00-28.00
Electric furnace bundles	46.00-47.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	47.50-48.00
Stove plate	44.50-45.50
Bar crops and plate	49.00-50.00
Structural plate, 2 ft	48.00-49.00
Unstripped motor blocks	36.00-37.00
Charging box cast	30.00-31.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt	46.00-47.00
Rails, 18-in. and under	59.00-60.00
Rails, rerolling	60.00-61.00
Rails, random lengths	53.00-54.00
Angles, splice bars	55.00-56.00

PHILADELPHIA

No. 1 heavy melting	48.00
No. 2 heavy melting	43.00
No. 1 bundles	48.00
No. 2 bundles	38.00
No. 1 busheling	48.00
Electric furnace bundles	49.00†
Machine shop turnings	*31.00-32.00*
Mixed borings, turnings	*31.00-32.00*
Short shovel turnings	*34.00*
Heavy turnings	*44.00*
Structurals, & plate	*51.00*
Couplers, springs, wheels	53.00
Rail crops, 2 ft & under	59.00-60.00

Cast Iron Grades

No. 1 cupola	*46.00-47.00*
Malleable	*61.50*
Heavy breakable cast	*49.00*
Drop broken machinery	*53.50-54.00*

†Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	*38.00-39.00*
No. 1 bundles	*43.00-44.00*
No. 2 bundles	*33.00-34.00*
Machine shop turnings	*22.00-23.00*
Mixed borings, turnings	*23.00-24.00*
Short shovel turnings	*25.00-26.00*
Low phos. (structural & plate)	*44.00-45.00*

Cast Iron Grades

No. 1 cupola	*38.00-39.00*
Unstripped motor blocks	25.00-26.00
Heavy breakable	*41.00-42.00*

Stainless Steel

18-8 sheets, clips, solids	*300.00-310.00*
18-8 borings, turnings	150.00-160.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*39.00-40.00*
No. 2 heavy melting	33.00-35.50
No. 1 bundles	*38.00-39.50*
No. 2 bundles	28.00-28.50
Machine shop turnings	21.00-21.50
Mixed borings, turnings	23.00-23.50
Short shovel turnings	24.00-24.50
No. 1 cast	36.00-36.50
Mixed cupola cast	34.00-34.50
No. 1 machinery cast	39.00-39.50

BUFFALO

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	37.00-38.00
No. 1 bundles	43.00-44.00
No. 2 bundles	32.00-33.00
No. 1 busheling	43.00-44.00
Mixed borings, turnings	29.00-30.00
Machine shop turnings	27.00-28.00
Short shovel turnings	30.00-31.00
Cast iron borings	30.00-31.00
Low phos.	*46.00-47.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	40.00-41.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	*53.00-54.00*
Rails, 3 ft and under	*55.00-56.00*
Railroad specialties	*45.00-46.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	35.00-36.00
No. 1 bundles	41.00-42.00
No. 2 bundles	32.00-33.00
No. 1 busheling	41.00-42.00
Machine shop turnings	25.50-26.50
Mixed borings turnings	24.75-25.75
Short shovel turnings	28.00-29.00
Cast iron borings	24.75-25.75
Low phos., 18 in.	50.00-51.00

Cast Iron Grades

No. 1 cupola	43.50-44.50
Heavy breakable cast	41.00-42.00
Charging box cast	41.00-42.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt	44.00-45.00
Rails, 18 in. and under	60.00-61.00
Rails, random lengths	53.00-54.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	
No. 2 heavy melting	
No. 1 bundles	
No. 2 bundles	
Machine shop turnings	
Short shovel turnings	

Cast Iron Grades

No. 1 cupola	
Charging box cast	
Heavy breakable cast	
Unstripped motor blocks	
Brake shoes	
Clean auto cast	
Stove plate	

Railroad Scrap

No. 1 R.R. heavy melt	
Rails, 18 in. and under	
Rails, random lengths	
Rails, rerolling	
Angles, splice bars	

SEATTLE

No. 1 heavy melting	
No. 2 heavy melting	
No. 1 bundles	
No. 2 bundles	
No. 3 bundles	
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Short shovel turnings	15.00
Electric furnace, No. 1	

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	
Heavy breakable cast	
No. 1 wheels	
Unstripped motor blocks	
Clean motor blocks	
Stove plate (f.o.b. plant)	
Brake shoes	

Railroad Scrap

Rails, random lengths	

LOS ANGELES

No. 1 heavy melting	
No. 2 heavy melting	
No. 1 bundles	
No. 2 bundles	
Machine shop turnings	

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	43.00

SAN FRANCISCO

No. 1 heavy melting	
No. 2 heavy melting	
No. 1 bundles	
No. 2 bundles	
No. 1 busheling	
Machine shop turnings	
Mixed borings, turnings	
Short shovel turnings	
Cast iron borings	
Cut structurals	
Heavy turnings	
Punchings & plate scrap	

Cast Iron Grades

No. 1 cupola	
Charging box cast	
Stove plate	
Heavy breakable cast	
Unstripped motor blocks	
Brake shoes	
Clean auto cast	
No. 1 wheels	
Burnt cast	
Drop broken machinery	

HAMILTON, ONT.

No. 1 heavy melting	
No. 2 heavy melting	
No. 1 bundles	
No. 2 bundles	
Mixed steel scrap	
Mixed borings, turnings	
Rails, remelting	
Busheling, new factory:	
Prepared	
Unprepared	
Short steel turnings	

Cast Iron Grades†

No. 1 machinery cast	42.00

†F.o.b., shipping point.

LOGEMANN

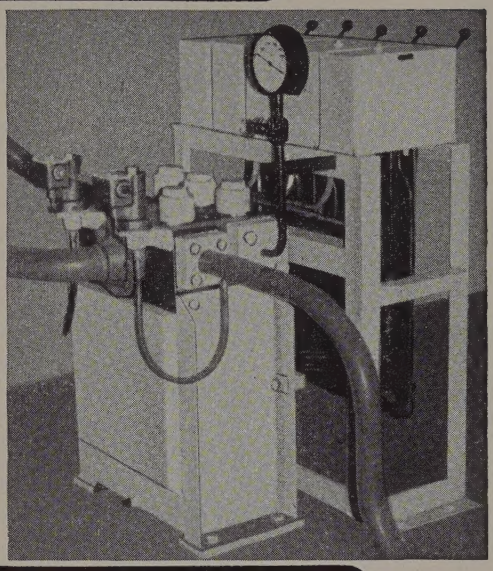
LOGEMANN Metal Balers

. . . powerful . . . compact . . . capable of high tonnage output!

In the large stamping plants and rolling mills where it is critically important that trim and stamping skeletons are quickly disposed of to avoid interference with production, LOGEMANN metal balers are relied on to keep ahead of production and pack such scrap into high density, self-cohering bricks for re-melting.

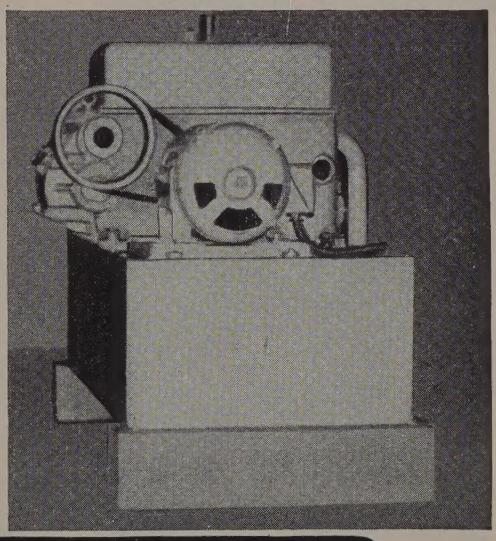
Hundreds of installations have established new records for tonnage, minimum maintenance, reliability, over extended periods of uninterrupted operation at high-speed.

LOGEMANN models are not confined to the large sizes. Many small plants have found it profitable to use smaller sizes embodying the same features of reliability, at minimum operating cost. Interested parties are invited to write for details. Information as to the character of the scrap, tonnage to be handled in a given period of hours, and range of gauges is helpful in determining the proper model.



HYDRAULIC VALVES

The illustration shows a close-coupled hydraulic valve, operated by compressed-air cylinders for high-speed distribution of large gallonage of fluid at high pressure. LOGEMANN engineers have designed and built valves for many unusual as well as standard applications, and will welcome inquiries, with an outline of the conditions and requirements.



HYDRAULIC PUMPS

The opposed-cylinder close-coupled double pressure pump shown in the illustration is mounted on an individual tank to conserve floor space under present crowded plant and operating conditions. When requesting details, please indicate the nature of the service, pressure and gallonage requirements, and the fluid to be handled.

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(*Concluded from page* 197)

turnings, $44. Structurals and plate have strengthened to a flat $51, delivered. No change is noted in the major open-hearth grades which may hold close to current levels for a while.

Buffalo—Movement of scrap in this area dropped sharply last week. A heavy snow fall closed dealers' yards in sections hardest hit. Meanwhile, buying interest is supporting prices at unchanged levels. The storm virtually halted steel production for two days but output rebounded rapidly as roads were reopened.

Cincinnati—No new scrap prices have been announced by the local mill, but higher levels are expected. Best guesses assume that the market will advance at least $2 in the open-hearth grades.

St. Louis—Scrap prices shot up $1 to $5 as mills ended a months-long rein on buying and went into the market to replenish ground stocks which dwindled under continued above-capacity operations. They offered a $2.50 increase on most No. 1 and 2 melting grades. Railroad grades, for which they had been offering a premium, took on an added premium as supplies showed no sign of increasing. The long-inert cast grades also rose under demand of out-of-district melters.

Birmingham—Although the largest district scrap buyer has been out of the market for over a month, open-hearth material continues scarce due to shipments to outside consuming points. Electric furnace scrap and cast are scarce, reflecting increased local consumption.

An Atlanta mill that has been paying premium prices on scrap brought in from outside the district raised its buying price on No. 2 heavy melting to $41, delivered Atlanta. It bought a limited amount of No. 2 bundles at $33, delivered Atlanta.

Los Angeles—Increased purchases of machine shop turnings have strengthened the scrap market. Prices remain steady, although increases in most products are anticipated after the first of the year.

San Francisco—No. 1 cupola cast has moved out of the $47-$48-per-ton price range of recent weeks to a straight $50. The increase reflects improved demand from the foundries.

Seattle—Steel scrap prices remain firm at $44 for No. 1 heavy melting, $40 for the No. 2 grade. Mills are buying in good volume because their inventories are slightly below normal. Receipts are heavy, but are expected to decline during the next 90 days. Exporters are assembling a full cargo at Portland, Oreg., and Seattle f shipment to Japan.

Pig Iron . . .

Pig Iron Prices, Page 185

Pig iron is holding up well, wi some evidence of protective cove ing. Buyers say they see no indic tions of an early price increase, b that they feel a bit more comfortab with more tonnage on hand. Th continued uptrend in cast scrap pric is also stimulating pig iron buyi among foundrymen.

While some easing in demand expected later in the month due holiday influences, demand so far th fall has been at the year's high most districts.

Metallurgical Coke . .

Metallurgical Coke Prices, Page 195

The first coke was pushed fro Republic Steel Corp.'s new batter of by-product ovens at its Massillo O., works last week. The battery ha a capacity of 183,000 tons of cok annually. The ovens were built o the foundation of an old battery.

Rails, Cars . . .

Track Material Prices, Page 183

The Bessemer, Ala., plant of th Pullman-Standard Car Mfg. Co. is as sured steady operation into 1957 b receipt of an order for 1700 freigh cars from the St. Louis-San Fran cisco Railroad. Cost: Approximatel $13 million. The road will build a additional 300 cars in its own shops

Iron Ore . . .

Iron Ore Prices, Page 195

Shipments of 12,243,518 gross ton of iron ore on the Great Lakes in Oc tober were exceeded in only one pre vious October (1952, when 13,013,25 tons were moved). Cumulative move ment of ore in the 1955 navigatio season to Nov. 1 was 79,865,67 gross tons.

Canada . . .

Iron and steel production in Can ada is at record breaking pace. I August, 288,864 net tons of pig iro were produced. This compares wit 266,697 tons in July and 166,580 i August, 1954. In the first eigh months of this year, pig iron outpu totaled 2,077,239 tons, against 1, 479,055 in the like 1954 period.

Production of steel for ingots an castings in August was 386,730 ne tons, against 360,765 in July an 241,504 in August, 1954. In the firs eight months, cumulative productio was 2,899,059 tons, against 2,105,19 in the corresponding period a yea ago.